IEEE Standards

IEEE 802.5v-2001
(Amendment to
IEEE Std 802.5, 1998 Edition and
IEEE Stds 802.5r and 802.5j, 1998 Edition)

IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements

Part 5: Token Ring access method and Physical Layer specifications

Amendment 5: Gigabit Token Ring operation

IEEE Computer Society

Sponsored by the
LAN/MAN Standards Committee

This amendment is an approved IEEE Standard. It will be incorporated into the base standard in a future edition.

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Approved 4 May 2001
IEEE-SA Standards Board

Abstract: This amendment specifies the changes required to IEEE 802.5, 1999 Edition (ISO/IEC 8802-5:1998 base standard), IEEE Stds 802.5r and 802.5j, 1998 Edition (ISO/IEC 8802-5:1998/ Amd. 1:1998), and IEEE Std 802.5t-1999, to support 1000 Mbit/s Dedicated Token Ring (DTR) operation. The base standard together with Amendment 1 specifies shared and dedicated (point-to-point) Token Ring operation at both 4 and 16 Mbit/s using either the TKP Access Protocol or the TXI Access Protocol. IEEE Std 802.5t-2000 extends Token Ring operation to 100 Mbit/s for the DTR C-Port and Station using the TXI Access Protocol. This standard extends Token Ring operation to 1000 Mbit/s for the DTR C-Port and Station using the TXI Access Protocol. Extensions to the Media Access Control have been made to accommodate the requirements for the 1000 Mbit/s media rate.
Keywords: Token Ring operation, TKP Access Protocol, TXI Access Protocol, DTR C-Port and Station

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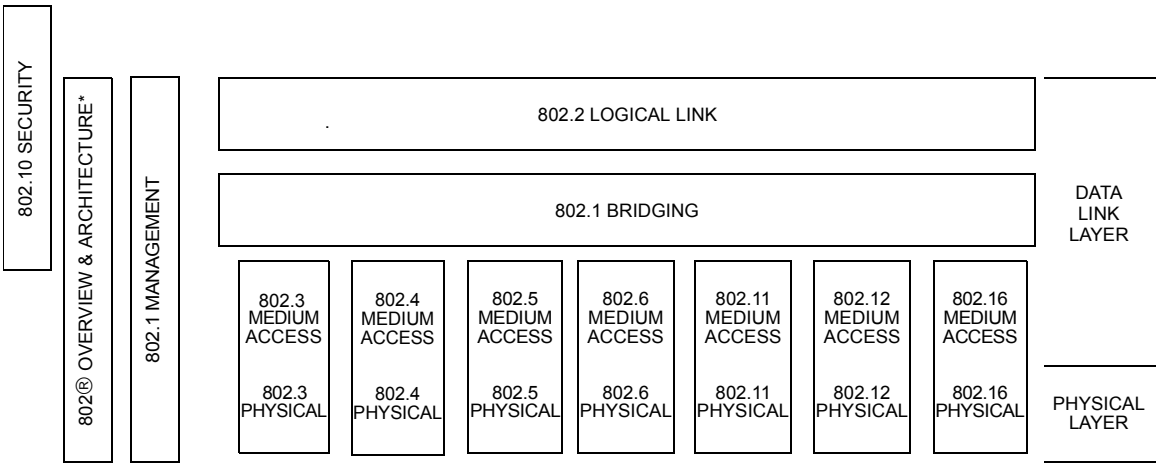
Introduction

(This introduction is not part of IEEE Std 802.5v-2001, IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 5: Token Ring access method and Physical Layer specifications—Amendment 5: Gigabit Token Ring operation.)

This standard is part of a family of standards for local and metropolitan area networks. The relationship between the standard and other members of the family is shown below. (The numbers in the figures refer to IEEE standard numbers.).



* Formerly IEEE Std 802.1A.

This family of standards deals with the Physical and Data Link Layers as defined by the International Organization for Standardization (ISO) Open Systems Interconnection Basic Reference Model (ISO/IEC 7498-1:1994). The access standards define several types of medium access technologies and associated physical media, each appropriate for particular applications or system objectives. Other types are under investigation.

The standards defining the technologies noted above are as follows:

• IEEE Std 802[1]:	*Overview and Architecture*. This standard provides an overview to the family of IEEE 802® Standards. This document forms part of the IEEE 802.1 scope of work.
• ANSI/IEEE Std 802.1B and 802.1K [ISO/IEC 15802-2]:	*LAN/MAN Management*. Defines an Open Systems Interconnection (OSI) management-compatible architecture, and services and protocol elements for use in a LAN/MAN environment for performing remote management.
• ANSI/IEEE Std 802.1D	*Medium Access Control* (*MAC) Bridges*. Specifies an architecture and protocol for the [ISO/IEC 15802-3]:interconnection of IEEE 802 LANs below the MAC service boundary.
• ANSI/IEEE Std 802.1E [ISO/IEC 15802-4]:	*System Load Protocol*. Specifies a set of services and protocol for those aspects of management concerned with the loading of systems on IEEE 802 LANs.

[1]The IEEE 802 Architecture and Overview Specification, originally known as IEEE Std 802.1A, has been renumbered as IEEE Std 802. This has been done to accommodate recognition of the base standard in a family of standards. References to IEEE Std 802.1A should be considered as references to IEEE Std 802.

• ANSI/IEEE Std 802.1F	*Common Definitions and Procedures for IEEE 802 Management Information*.
• ANSI/IEEE Std 802.1G [ISO/IEC 15802-5]:	*Remote Media Access Control (MAC) Bridging*. Specifies extensions for the interconnection, using non-LAN systems communication technologies, of geographically separated IEEE 802 LANs below the level of the logical link control protocol.
• ANSI/IEEE Std 802.1H [ISO/IEC TR 11802-5]	*Recommended Practice for Media Access Control (MAC) Bridging of Ethernet V2.0 in IEEE 802 Local Area Networks*.
• ANSI/IEEE Std 802.1Q	*Virtual Bridged Local Area Networks*. Defines an architecture for Virtual Bridged LANs, the services provided in Virtual Bridged LANs, and the protocols and algorithms involved in the provision of those services.
• ANSI/IEEE Std 802.2 [ISO/IEC 8802-2]:	*Logical Link Control*.
• ANSI/IEEE Std 802.3 [ISO/IEC 8802-3]:	*CSMA/CD Access Method and Physical Layer Specifications*.
• ANSI/IEEE Std 802.4 [ISO/IEC 8802-4]:	*Token Bus Access Method and Physical Layer Specifications*.
• ANSI/IEEE Std 802.5 [ISO/IEC 8802-5]:	*Token Ring Access Method and Physical Layer Specifications*.
• ANSI/IEEE Std 802.6 [ISO/IEC 8802-6]:	*Distributed Queue Dual Bus Access Method and Physical Layer Specifications*.
• ANSI/IEEE Std 802.10:	*Interoperable LAN/MAN Security*. Currently approved: Secure Data Exchange (SDE).
• ANSI/IEEE Std 802.11:	*Wireless LAN Medium Access Control (MAC) Sublayer and* [ISO/IEC 8802-11]Physical Layer Specifications.
• ANSI/IEEE Std 802.12: [ISO/IEC 8802-12]	*Demand Priority Access Method, Physical Layer and Repeater Specification*.
• IEEE Std 802.15:	*Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for: Wireless Personal Area Networks.*
• IEEE Std 802.16:	*Standard Air Interface for Fixed Broadband Wireless Access Systems*.
• IEEE Std 802.17:	*Resilient Packet Ring Access Method and Physical Layer Specifications.*

In addition to the family of standards, the following is a recommended practice for a common Physical Layer technology:

• IEEE Std 802.7:	*IEEE Recommended Practice for Broadband Local Area Networks*.

The reader of this standard is urged to become familiar with the complete family of standards.

Participants

Voting members of the IEEE 802.5 Working Group who participated in developing this standard were as follows:

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The editing instructions are shown in ***bold italic***. Three editing instructions are used: change, delete, and insert. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed either by using ~~strikethrough~~ (to remove old material) or underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. Editorial notes will not be carried over into future editions.

Introduction

This amendment specifies the changes required to IEEE 802.5, 1998 Edition (ISO/IEC 8802-5:1998 base standard), IEEE Stds 802.5r and 802.5j, 1998 Edition (ISO/IEC 8802-5:1998/Amd. 1:1998), and IEEE Std 802.5t-2000 to support 1000 Mbit/s Dedicated Token Ring (DTR) operation.

IEEE 802.5, 1998 Edition (base standard) together with Amendment 1 specifies shared and dedicated (point-to-point) Token Ring operation at both 4 and 16 Mbit/s using either the TKP Access Protocol or the TXI Access Protocol. IEEE Std 802.5t-2000 extends Token Ring operation to 100 Mbit/s for the DTR C-Port and Station using the TXI Access Protocol. This standard extends Token Ring operation to 1000 Mbit/s for the DTR C-Port and Station using the TXI Access Protocol. Extensions to the Medium Access Control have been made to accommodate the requirements for the 1000 Mbit/s media rate.

1. Overview

Change the following in Clause 1:

1.1 Scope

Insert the following:

ii) Defines Dedicated Token Ring operation at 1000 Mbit/s

1.2 Normative references

Insert the following:

ANSI X3.230-1994 Information Technology—Fibre Channel—Physical and Signalling Interface (FC-PH).

IEEE Std 802.3ab-1999 Information Technology—Telecommunications and information exchange between systems—Local and Metropolitan Area Networks—Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications.

1.3 Definitions

Insert the following:

Gigabit Media Independent Interface (GMII). A set of signals defined within [802.3], Clause 35, that provide the interface between the 1000 Mbit/s Reconciliation Sublayer and PHY.

The usage of these signals within this standard to provide the interface between the 1000 Mbit/s Token Ring MAC Reconciliation Sublayer and PHY is defined in 9.8.

Reconciliation Sublayer. A mapping function defined in [802.3], Clause 35.

A new reconciliation sublayer is defined in 9.8 to perform the mapping function that reconciles the signals at the Gigabit Media Independent Interface (GMII) to the 1000 Mbit/s Token Ring Media Access Control (MAC) — Physical Signalling Components (PSC) service definitions.

Ten Bit Interface (TBI). A set of signals defined within [802.3], Clause 36, that provide the interface between the 1000BASE-X PCS and PMA sublayers. The use of these signals within this standard is described in 9.8.

1.5 Acronyms and abbreviations

Insert the following:

GMII = gigabit media independent interface

PMC-CX = PMC for 1000 Mbit/s over twin-axial copper cabling

PMC-LX = PMC (long wavelength laser) for 1000 Mbit/s over optical fibre cabling

PMC-SX = PMC (short wavelength laser) for 1000 Mbit/s over optical fibre cabling

PMC-T = PMC for 1000 Mbit/s over 4 pairs of Category 5 balanced copper cabling

PSC-T = PSC for 1000 Mbit/s over 4 pairs of Category 5 balanced copper cabling

PSC-X = PSC for 1000 Mbit/s over optical fibre and twin-axial copper cabling

TBI = ten-bit interface

Insert 2.2.3:

2.2.3 1000 Mbit/s C-Port and Station functional organization and data flow

Figure 2.2-3 illustrates the data flow in a C-Port or Station indicating which clauses of this standard address the various functions of a Token Ring C-Port or Station. The figure is applicable to all copper and fibre media. The operation of the Station is specified in 9.2, and operation of the C-Port is specified in 9.3 with an overview of common C-Port and Station functions specified in 9.1. Internal service interfaces have been defined solely for the purpose of specifying operation between the clauses and are not requirements for an externally visible interface for a physical interface. The approximate positions of an optional GMII type interface and its attendant Reconciliation Sublayer are shown in Figure 2.2-3. Although the service primitives shown crossing this interface do not directly correspond to physical GMII signals, it is possible to implement logically equivalent functionality either directly through the Reconciliation Sublayer via the GMII signals, or indirectly via serially accessed PHY management registers.

a) The PMC/PSC internal service interface (PM_UNITDATA.request, PM_UNITDATA.indication) defines the information exchange between the physical media components (PMC) specified in 9.7 and 9.8 and the physical signalling components (PSC) specified in 9.8.

b) The PSC/MAC internal service interface (PS_CONTROL.request, PS_STATUS.indication, PS_UNITDATA.indication, PS_UNITDATA.request) defines the control mechanism of, the mechanism for indicating the status of, and the information exchange between the physical signalling components (PSC) specified in 9.8 and the MAC sublayer specified in Clause 9 and Clause 14 Clause 14 defines frame formats and station facilities. Clause 9 specifies the C-Port’s PMAC and Station's SMAC protocol that uses the formats and facilities defined in Clause 14 to receive and transmit information. This service interface is defined in 9.8.

c) The PMAC/SMAC/LLC service interface (MA_UNITDATA.indication, MA_UNITDATA.request) is specified in ISO/IEC 15802-1 and is used as specified in 9.1. It defines the information exchange between the PMAC/SMAC sublayer and the LLC sublayer.

d) The PMAC/SMAC/Bridge service interface (M_UNITDATA.indication, M_UNITDATA.request, M_UNITDATA.response) is specified in IEEE Std 802.1d-1993 and is used as specified in 9.1 and defines the information exchange between the MAC and the internal bridging sublayer.

e) The PMAC/SMAC/MGT service interface (MGT_UNITDATA.indication, MGT_UNIT-DATA.request, MGT_CONTROL.request, MGT_STATUS.indication) defines the control mechanism of, the mechanism for indicating the status of, and the information exchange between the PMAC/SMAC protocol specified in Clause 9 and management (MGT). The managed objects are specified in Clause 11. The MGT_UNITDATA.indication and MGT_UNITDATA.request primitives are specified in Clause 9 and are used to convey MAC management frames between the MAC and the appropriate management function (e.g., RPS, CRS, REM). The Physical Layer (PHY) of the Station and C-Port consists of the physical media components (PMC), specified in 9.7 and 9.8, and the physical signalling components (PSC) specified in 9.8.

Insert Figure 2.2-3:

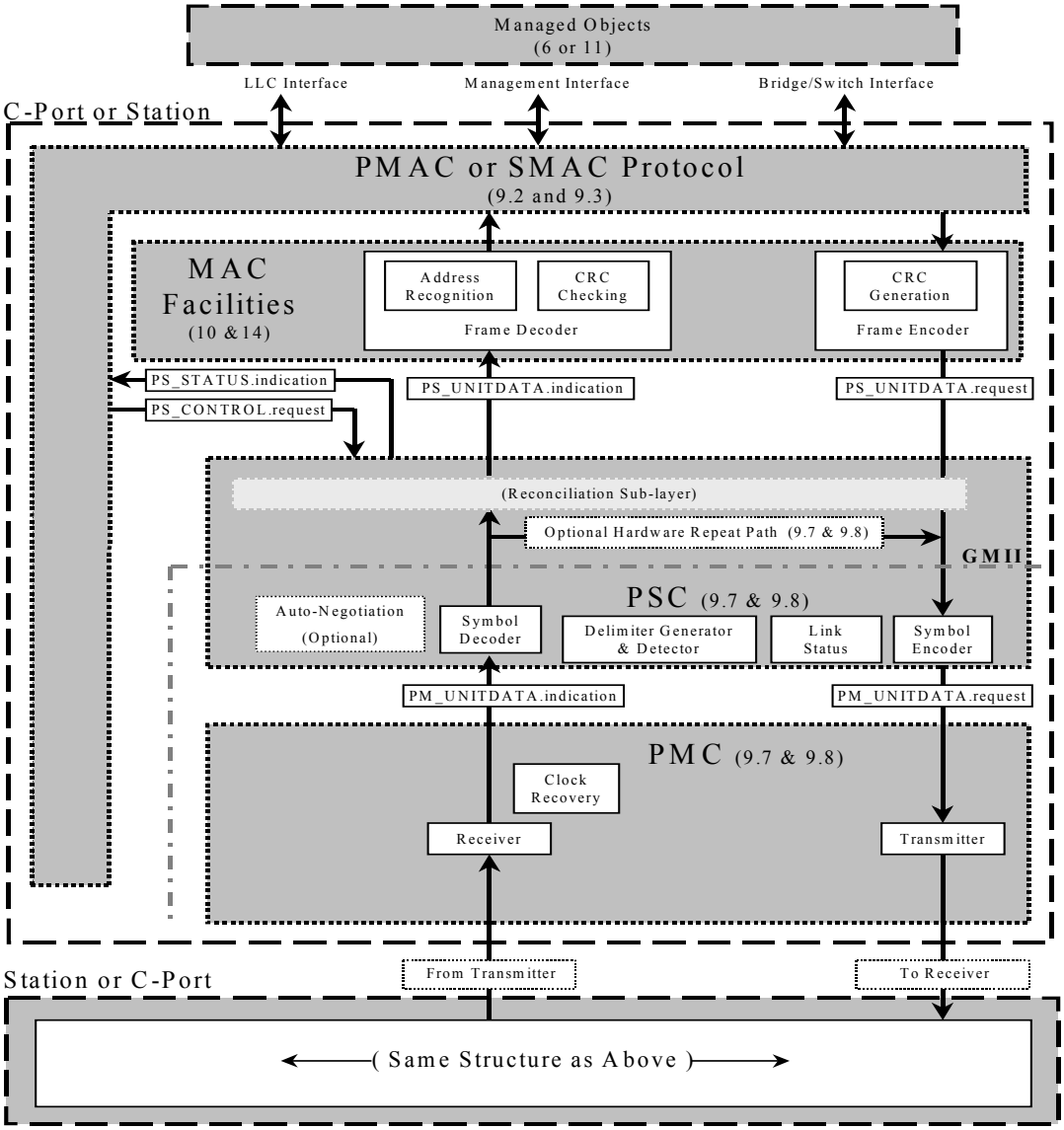


Figure 2.2-3—1000 Mbit/s Operation Overview

9. Dedicated Token Ring

Delete the line in Clause 9 stating:

•FSMRO>2 or FPMRO>2: reserved and not defined by this supplement.

Replace it with the two lines:

•FSMRO=3 or FPMRO=3: 1000 Mbit/s.

•FSMRO>3 or FPMRO>3: reserved and not defined by this supplement.

In 9.1.1.6, change the Properties of a Frame as follows:

Delete the following line:

L — Ends with two valid hexadecimal values (0 through F) followed by a valid ESD signal.

Replace it with the following line:

L — Ends with two valid code-groups representing data (and not frame violation) followed by a valid ESD signal.

Delete the following line:

M — Ends with at least one hexadecimal value (0 through F) in the two code-groups preceding a valid ESD signal.

Replace it with the following line:

M — Ends with at least one valid code-group representing data (and not frame violation) in the two code-groups preceding a valid ESD signal.

Replace 9.2 with the following:

9.2 Station TXI Access Protocol specification

This subclause defines the TXI Access Protocol as follows:

a) The DTR Station (FIPTXIS=0) in support of Configuration 1 entity (B).
b) The DTR C-Port in the Station Emulation Mode (FIPTXIS=1) in support of Configuration 2 entity (C).

The decision as to which configuration is being supported is made as follows:

— The DTR Station's Join Station Operation Table specified by Table 9.2-1, or
— The DTR C-Port's Join Port Operation Table specified in 9.3 by Table 9.3-1.

NOTE—For ease of reading, the DTR Station and the DTR C-Port in Station Emulation Mode are referred to as the "Station" in the explanatory portion of this subclause.

Seven Station Operation Tables specify Station support of the TXI Access Protocol as follows:

1) The Station Join Station Operation—Table 9.2-1
2) The Station Transmit Station Operation—Table 9.2-2
3) The Station Monitor Station Operation—Table 9.2-3
4) The Station Error Handling Station Operation—Table 9.2-4
5) The Station Interface Signals Station Operation—Table 9.2-5
6) The Station Miscellaneous Frame Handling Station Operation—Table 9.2-6
7) The Station Lobe Media Test when FSLMTO=1 Station Operation—Table 9.2-7

Low-Level FSM diagrams representing the state changes in the Join, Transmit, and Monitor Station Operation Tables are presented in Annex L.

In case of a discrepancy between the Station Operation Tables, the FSM diagrams, or their supporting text, the Station Operation Tables shall take precedence.

9.2.1 FSM Overviews

This subclause provides a functional overview of the Join, Transmit, and Monitor Station Operation Tables using three high-level FSM diagrams.

9.2.1.1 Station Join FSM Overview

The Station Join FSM, shown in Figure 9.2-1, is used to join the Station in the TXI Access Protocol to the C-Port. Table 9.2-1 specifies the Join FSM.

The Station Join FSM enters the Registration state (JA) from

a) the Bypass state (J0) as the result of this subclause detecting a Connect.SMAC to start the Station's TXI Access Protocol,
b) the Bypass state (J0) as the result of 9.3 entering the C-Port in Station Emulation Mode using the TXI Access Protocol, or
c) the Registration Wait state (J9) as the result of the 9.5 or 9.6 Station Operation Tables using the TKP Access Protocol responding to a Registration Query request from the C-Port.

The activation of the TXI Access Protocol is the result of the Registration Process and uses the Station Operation Tables specified in this subclause.

The TKP Access Protocol is activated as the result of the Registration Process as follows:

— For the DTR Station, via an exit to the 9.6 Station Operation Tables.
— For the C-Port in Station Emulation Mode, via an exit to the 9.5 Port Operation Tables.

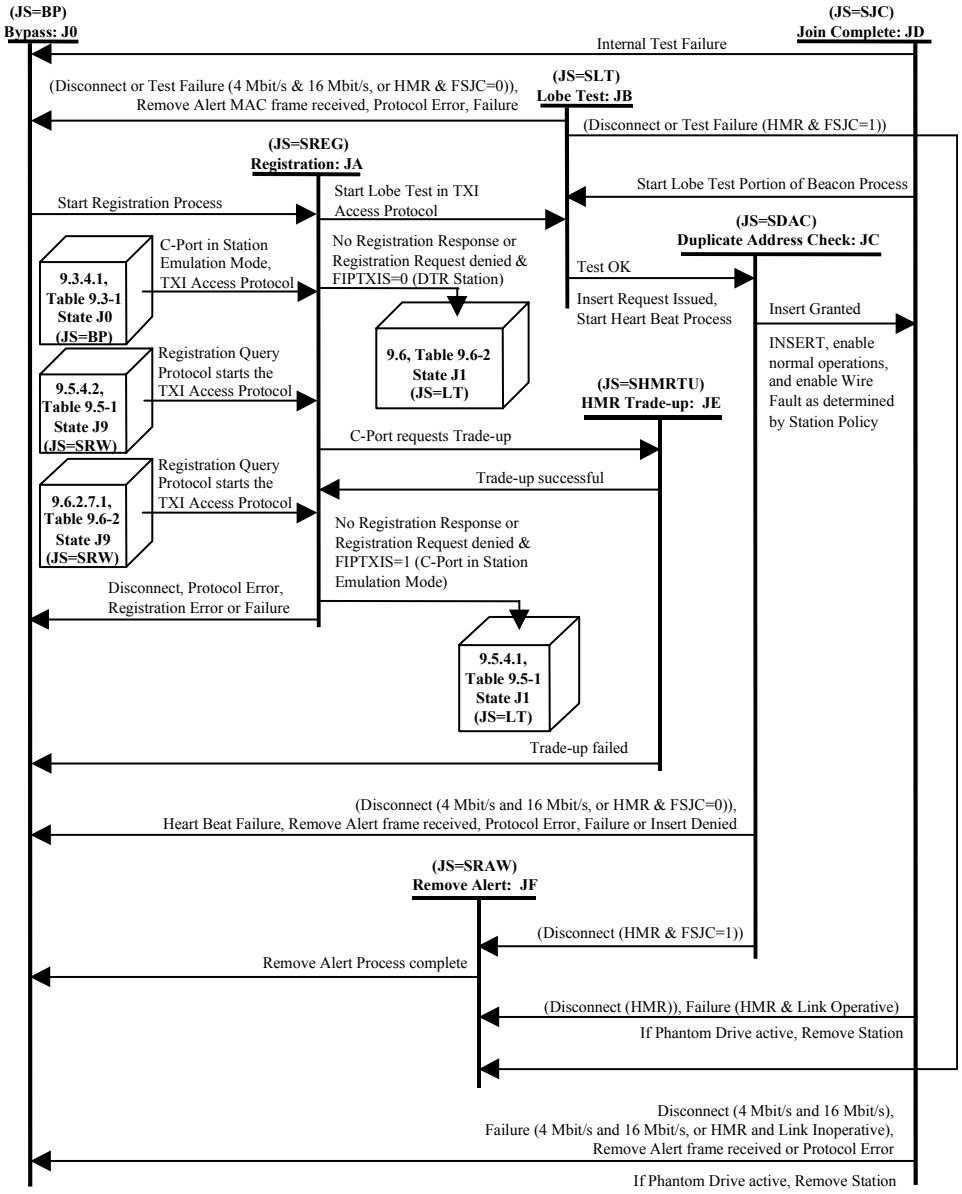


Figure 9.2-1—Station Join FSM Overview

9.2.1.2 Station Transmit FSM Overview

The Station Transmit FSM, shown in Figure 9.2-2, is used to transmit frames using the TXI Access Protocol. Table 9.2-2 specifies this Transmit FSM.

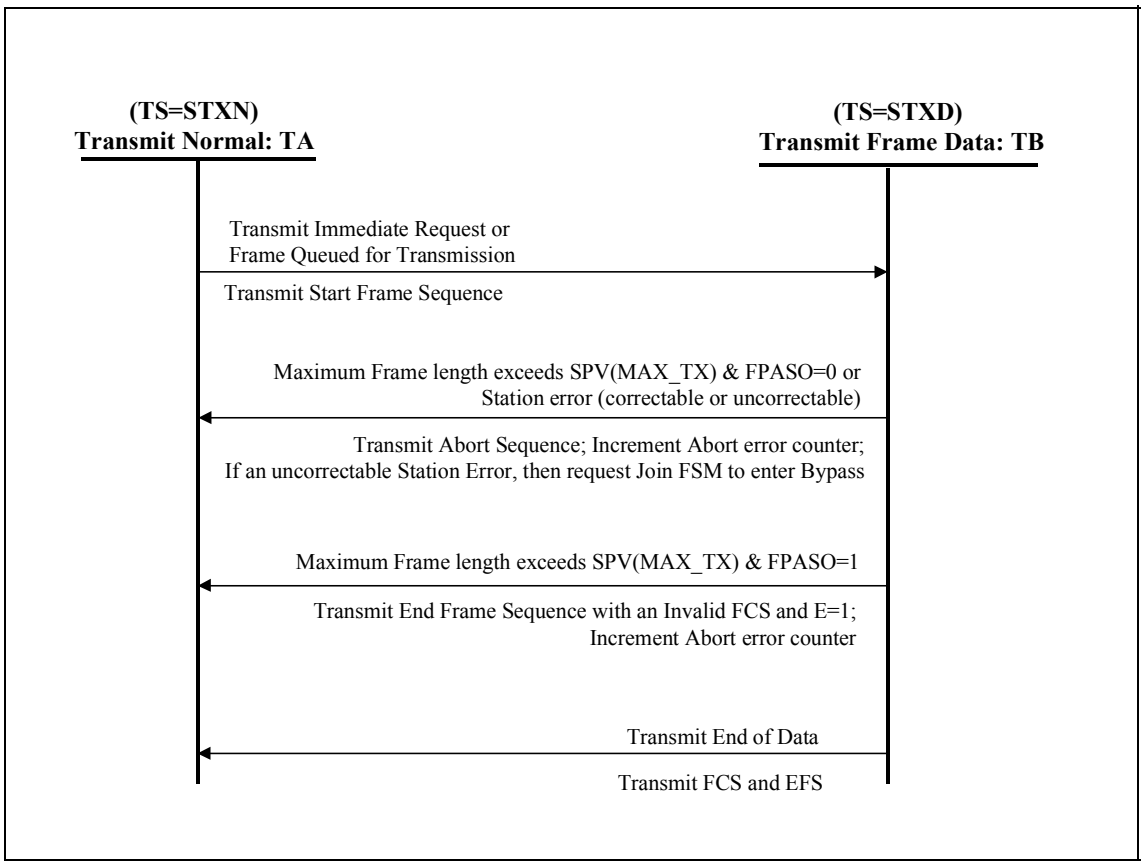


Figure 9.2-2—Station Transmit FSM Overview

9.2.1.3 Station Monitor FSM Overview

The Station Monitor FSM, shown in Figure 9.2-3, supports the Heart Beat and Hard Error Recovery functions. Table 9.2-3 specifies the Monitor FSM.

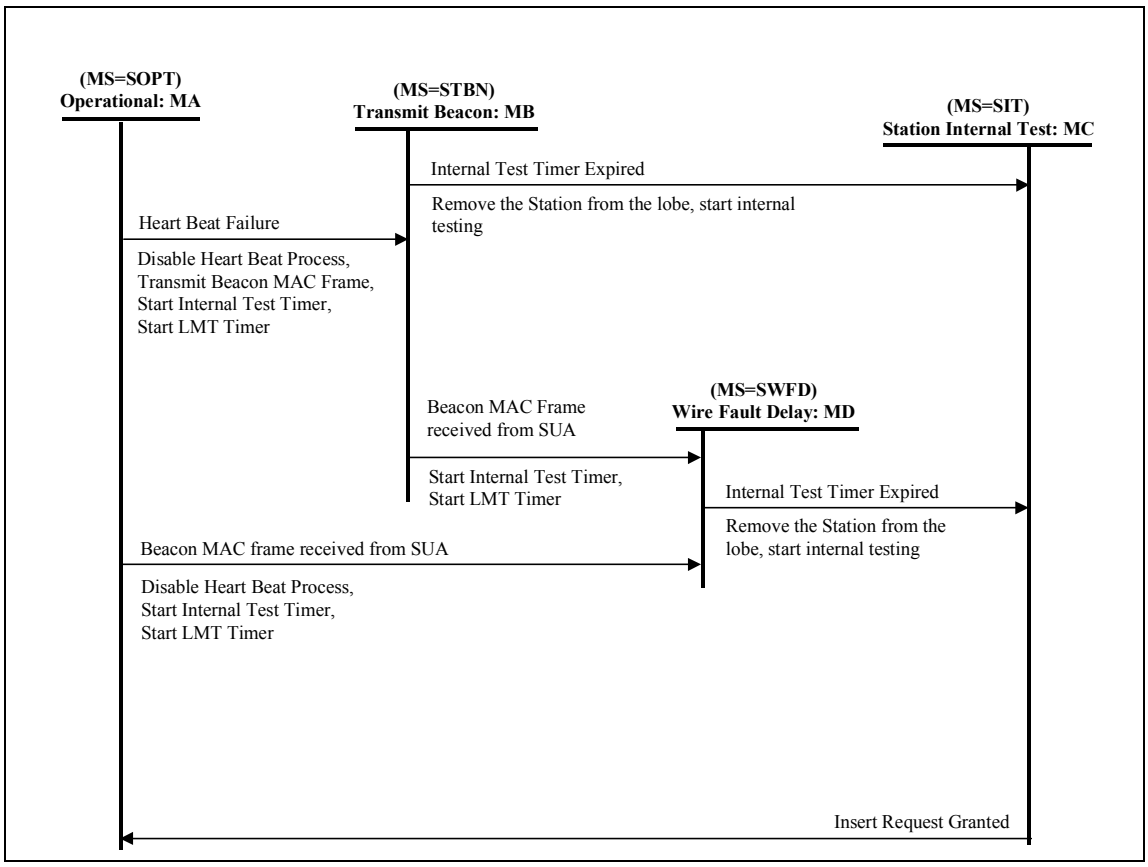


Figure 9.2-3—Station Monitor FSM Overview

9.2.2 Specification—Abbreviations and Notations

The following abbreviations and notations are used in the Station Operational Tables.

PMAC Policy Flag Notations
FPASO = Flag, C-Port abort sequence option
FPMRO = Flag, C-Port media rate option

PMAC Protocol Flag Notations
FPTX_LTH = Flag, C-Port transmit length
FPMR = Flag, C-Port media rate

SMAC Policy Flag Notations
FSASO = Flag, Station abort sequence option
FSECO = Flag, Station error counting option
FSHMRTUO = Flag, Station High Media Rate Trade-up option
FSLMTO = Flag, Station LMT option
FSMRO = Flag, Station medium rate option
FSOPO = Flag, Station open option
FSRDO = Flag, Station registration denied option
FSREGO = Flag, Station registration option
FSRRO = Flag, Station reject remove option

SMAC Station Policy Variables Notations
SPV(AP_MASK) = Access Protocol Mask Station Policy Variable
SPV(IAC) = Individual address count Station Polic Variable
SPV(MAX_TX) = Maximum octets transmit count Station Policy Variable
SPV(PD) = Phantom Drive Station Policy Variable

SMAC C-Port Interface Flag Notations
FIPTKPS = Flag, Interface C-Port TKP Station Emulation
FIPTXIS = Flag, Interface C-Port TXI Station Emulation

SMAC Station Counters
CSBTX = Counter, Station byte transmitted
CSREQ = Counter, Station registration request
CSTFQ = Counter, Station TXI frames queued
CSLTF = Counter, Station lobe test frames
CSRAT = Counter, Station remove alert transmit

SMAC Error Counter Notations
CSABE = Counter, Station abort error
CSBE = Counter, Station burst error
CSFE = Counter, Station frequency error
CSIE = Counter, Station internal error
CSLE = Counter, Station line error
CSRCE = Counter, Station receive congestion error

SMAC Protocol Flag Notations
FSBNT = Flag, Station beacon test
FSBPF = Flag, Station bypass force
FSER = Flag, Station error report
FSHBA = Flag, Station heart beat active
FSHMRTUA = Flag, Station high media rate trade-up active
FSIRD = Flag, Station insert request delay
FSJC = Flag, Station join process complete
FSLMTF = Flag, Station lobe media test failure
FSLMTS = Flag, Station lobe media test success
FSMR = Flag, Station media rate
FSRLMT = Flag, Station request lobe media test
FSLTA = Flag, Station lobe test active
FSLTFE = Flag, Station lobe test frame error
FSOP = Flag, Station operational
FSPDC = Flag, Station phantom drive control
FSPDA = Flag, Station phantom drive active
FSRC = Flag, Station registration complete
FSRRC = Flag, Station return to recovered clock
FSSL = Flag, Station signal loss
FSSLD = Flag, Station signal loss detected
FSSLMT = Flag, Station start lobe media test
FSTAS = Flag, Station Transmit Abort Sequence
FSTI = Flag, Station transmit idles
FSTXC = Flag, Station transmit from crystal
FSWF = Flag, Station wire fault
FSWFA = Flag, Station wire fault active
FTI = Flag, Transmit Idles (from Clause 4)

SMAC Stored Value Notation
SUA = stored upstream address

SMAC Join State Notations

JS = BP: Bypass
JS = SDAC : Station Duplicate Address Check
JS = SHMRTU : Station High Media Rate Trade-up
JS = SJC : Station Join Complete
JS = SLT : Station Lobe Test
JS = SRAW : Station Remove Alert wait
JS = SREG : Station Registration

SMAC Transmit State Notations

TS = STXD : Station Transmit Frame Data
TS = STXN : Station Transmit Normal

SMAC Monitor State Notations

MS = SIT : Station Internal Test
MS = SOPT : Station Operational
MS = STBN : Station Transmit Beacon
MS = SWFD : Station Wire Fault Delay

SMAC Station Timer Notations

TSHMRW = Timer, Station high media rate wait
TSER = Timer, Station error report
TSIP = Timer, Station insert process
TSIS = Timer, Station initial sequence
TSIT = Timer, Station internal test
TSJC = Timer, Station join complete
TSLMT = Timer, Station lobe media test
TSLMTNP = Timer, Station lobe media test notification pacing
TSLMTP = Timer, Station lobe media test pacing
TSLMTR = Timer, Station lobe media test response
TSLMTC = Timer, Station lobe media test complete
TSLMTD = Timer, Station lobe media test delay
TSQHB = Timer, Station queue heart beat
TSQP = Timer, Station queue PDU
TSRAP = Timer, Station remove alert pacing
TSREQ = Timer, Station registration request
TSRHB = Timer, Station receive heart beat
TSSL = Timer, Station signal loss
TSWF = Timer, Station wire fault
TSWFD = Timer, Station wire fault delay

9.2.3 State Machine Elements

The state machines use the Error Counters defined in 10.6 as well as the following counters, flags, and states to describe the operation of the Station. These are logical elements used solely to describe the operation and do not specify an implementation. The value of the flags and counters are only meaningful to the Station Operation Tables. Conformance to this standard is based only on externally observable behavior.

9.2.3.1 SMAC Counters

Unless otherwise specified, all counters are set to 0 by the “Set_initial_conditions” action.

A counter may be set to a value, counted up (increment), or counted down (decrement) as a result of an action specified in the Station Operation Table.

Counter, Station Byte Transmitted (CSBTX)

The counter CSBTX is used by the Transmit FSM to limit the number of octets that can be transmitted. This counter shall be used when the C-Port in Station Emulation Mode (Interface flags FIPTKPS=1 or FIPTXIS=1) is supporting the FR_LTH=UNK (frame length unknown) condition. The counter CSBTX is optional if the Station does not support FR_LTH=UNK.

The counter CSBTX is compared against SPV(MAX_TX) and the Station takes one of the following actions:

a) If CSBTX>SPV(MAX_TX), then the frame being transmitted is larger than allowed by SPV(MAX_TX) and the frame is aborted using an Abort Sequence.

b) If CSBTX<=SPV(MAX_TX), the transmission of the frame continues.

The value of SPV(MAX_TX) is specified in 10.5.1.2 when operating at 4 Mbit/s or 16 Mbit/s and 14.5.1.2 when operating at the High Media Rate.

Counter, Station Lobe Test Frames (CSLTF)

The counter CSLTF is used when FSLMTO=1 to count the number of frames to be transmitted as described in 9.1.6. Its initial value is specified in 9.2.5.4 as "n7."

Counter, Station Remove Alert Transmit (CSRAT), High Media Rate only

The counter CSRAT is used when supporting the High Media Rate (FSMR>1) to determine the number of Remove Alert MAC Frames yet to be transmitted. Its initial value is specified in 9.2.5 as "n8."

Counter, Station Registration Request (CSREQ)

The counter CSREQ is used to control the number of times the REG_REQ MAC frame will be retransmitted (an assured delivery process) before Registration fails. The Station sets counter CSREQ=n6 (see 9.2.5) when the first REG_REQ MAC frame is transmitted. Each time the Station retransmits the REG_REQ MAC frame it decrements counter CSREQ by one.

When the counter CSREQ=0, the Station has not received a response to its REG_REQ MAC frame and takes one of the following actions.

a) If the flag FSOPO=0, the Station supports the TKP Access Protocol and enters the Lobe Test state (JS=LT) of the TKP Access Protocol Join FSM defined in 4.3.

b) If the flag FSOPO=1, the Station does not support the TKP Access Protocol and enters the Bypass state (JS=BP) and notifies management of the error.

Counter, Station TXI Frames Queued (CSTFQ), 4 Mbit/s and 16 Mbit/s only

The counter CSTFQ is used by the Join FSM during JS=SDAC to track the number of frames currently in the TXI_REQ transmit queue (see 9.1.8). During JS=SDAC, this counter is incremented when a Station Heartbeat (TXI_SHB) or Insert Request (TXI_INS_REQ) is added to the TXI_REQ transmit queue. CSTFQ is decremented by the Transmit FSM when the Join FSM state is JS=SDAC and an EOD, a PORT_ERR(correctable) or a STATION_ERR(correctable) event is detected. CSTFQ is set to 1 when the Join FSM enters JS=SDAC.

9.2.3.2 Station Protocol Flags

The following Station protocol flags, listed alphabetically, are defined:

Flag, Station Beacon Test (FSBNT)

The flag FSBNT is used by the Monitor machine to signal the Join Machine to enter the Lobe Test (JS=SLT) state and perform the Lobe Media test function specified in 9.1.6 as part of the Hard Error Recovery Process. The flag is set to 1 by the Monitor machine when TSLMT has expired. The flag is set to 0 by the Join Machine when entering the Lobe Test state (JS=SLT).

Flag, Station Bypass Force (FSBPF)

When the Transmit Data state (TS=STXD) detects a "STATION_ERR(not_correctable)" condition, an Abort Sequence is optionally transmitted and the flag FSBPF is set to 1. The Join Machine enters the Bypass state (JS=BP) upon detecting flag FSBPF=1 and TS=STXN.

Flag, Station Error Report (FSER)

The flag FSER is set to 1 when the first reportable error is detected and indicates that subsequent errors should not reset the error timer TSER. The flag FSER is set to 0 when the error timer expires and the Report Error MAC frame is transmitted.

Flag, Station Heart Beat Active (FSHBA)

The flag FSHBA is set to 1 to activate the Heart Beat process and set to 0 to deactivate the Heart Beat Process. The flag FSHBA is set to 1 when the Station enters the Duplicate Address Check state (JS=SDAC). While the flag FSHBA is set to 1, loss of Heart Beat can be detected and Hard Error Recovery started. The flag FSHBA is set to 0 to deactivate the Heart Beat Process when the Monitor exits the Operational state (MS=SOPT) to enter either the Beacon Transmit state (MS=STBN) or the Wire Fault Delay state (MS=SWFD).

Flag, Station High Media Rate Trade-up Active (FSHMRTUA), 4 Mbit/s and 16 Mbit/s only

The flag FSHMRTUA is set to 1 when the Station has an outstanding HMR trade up registration request. It is used to allow the Station to retry registration without the HMR trade up option, after the C-Port has rejected the request.

Flag, Station Insert Request Delay (FSIRD), 4 Mbit/s and 16 Mbit/s only

The flag FSIRD is used by the Station in the Duplicate Address Check state (JS=SDAC) to delay the changing from recovered clock to crystal clock as the result of the expiration of the timer, Station Insert Process (TSIP). The Station in the JS=SDAC state normally uses recovered clock, but when the expiration of the timer TSIP occurs the Station is required to transmit the Insert Request MAC frame using crystal clock and the Station sets FSIRD=1. When the transmit machine enters the Transmit Normal state (TS=TSXN) and FSIRD=1, the Station sets FSIRD=0, activates crystal clock, and transmits the Insert Request MAC frame.

Flag, Station Join Complete (FSJC)

The flag FSJC indicates whether the Station has completed Join with FSJC=0 meaning Join is not complete and FSJC=1 meaning Join is complete. FSJC is set to 1 upon successful completion of the Station's Duplicate Address Check (JS=SDAC). When FSJC=1, the Station is allowed, for example, to queue frames for transmission, and to activate the Hard Error Recovery and Error Counter functions.

Flag, Station Lobe Media Test Failure (FSLMTF)

The flag FSLMTF is used to indicate that the Station has detected a Lobe Media Test failure. The flag FSLMTF is set to 1 when the Station detects a failure of either the LMT Notification Stage or the LMT Testing Stage and causes the Station to enter the Bypass state. The flag FSLMTF is set to 0 by the Set_initial_conditions action, but the value of 0 is not used.

Flag, Station Lobe Media Test Success (FSLMTS)

The flag FSLMTS is used to indicate the success of the Station's Lobe Media Test. The flag FSLMTS is set to 1 when the Station detects the successful completion of the LMT Testing Stage. FSLMTS is set to 0 when the Station transmits its INS_REQ MAC frame.

Flag, Station Lobe Test Active (FSLTA)

The flag FSLTA is used to indicate that the Station's Lobe Media Test function described in 9.1.6.2 is active. This flag is set to 1 when the Station starts the LMT function specified in Table 9.2-7. This flag is set to 0 when the Station successfully exits the Lobe Media Test state (JS=SLT).

Flag, Station Lobe Test Frame Error (FSLTFE)

The flag FSLTFE is used to indicate that the Station has detected a Lobe Media Test error. The flag FSLTFE is set to 1 when the Station detects an error within its LMT frame, or if it fails to receive its LMT frame. If an error is detected while FSLTFE is set to 1 (indicating more than one LMT error), the station indicates LMT Testing Stage failure.

Flag, Station Media Rate (FSMR)

The flag FSMR is used to control the operation of the Station Operation Tables as it relates to the operational speed of the medium. It has the same definition as the FSMRO flag defined in 14.5.1.1.4 except it is set as needed by the Station Operation Tables.

Flag, Station Operational (FSOP)

The flag FSOP indicates when the Station is operational. The flag FSOP is set to 1 when the Station enters Join Complete (JS=SJC) and becomes active in the network. The flag FSOP is set to 0 when the Station closes (JS=BP). FSOP is set to 0 when the Station enters the Hard Error Recovery Process and is set to 1 when the Station inserts after successful completion of the Hard Error Recovery Process.

Flag, Station Phantom Drive Control (FSPDC), High Media Rate only

The flag FSPDC indicates whether the Station using the High Media Rate has attempted to request the C-Port to use no Phantom after its request to use Phantom Drive during Station Registration (JS=SREG) has been rejected. The flag FSPDC is set to 0 by the Set_initial_conditions action. The flag FSPDC is set to 1 when the Station recognizes that its Registration Request with Phantom Drive was rejected or the first Registration Request is being made without Phantom Drive (SPV(PD)=0002). For Stations using 1000 Mbit/s medium rate, this flag will be set to 1 to indicate that all requests shall be made without Phantom Drive. This flag is not used at 4 Mbit/s or 16 Mbit/s.

Flag, Station Phantom Drive Active (FSPDA)

The flag FSPDA indicates whether the Station is using Phantom Drive. The flag FSPDA is set to 0 when the Station is not using Phantom Drive. The flag FSPDA is set to 1 when the Station is using Phantom Drive.

Flag, Station Registration Complete (FSRC)

The flag FSRC is set to 1 when a valid Registration Response MAC frame is received in the Station Registration state (JS=SREG) to disable the Registration process while waiting for timer, TSLMTD to expire.

Flag, Station Request LMT (FSRLMT)

The flag FSRLMT is used to request the execution of the Station's Lobe Media Test function described in 9.1.6.2. This flag is set to 1 when the Station detects the need to execute the Lobe

Media Test and executes the process defined in the Table 9.2-7. This flag is set to 0 after the Station starts the LMT function specified in Table 9.2-7.

Flag, Station Return to Recovered Clock (FSRRC), 4 Mbit/s and 16 Mbit/s only

The flag FSRRC is used with the counter CSTFQ during JS=SDAC to cause the station to change its clock source from crystal (FSTXC=1) to recovered clock (FSTXC=0). FSRRC is set to 1 when an Insert Request (TXI_INS_REQ) is added to the TXI_REQ transmit queue (see 9.1.8). FSRRC is set to 0 when CSTFQ decrements to 0 and FSRRC is set to 1.

Flag, Station Signal Loss (FSSL), 4 Mbit/s and 16 Mbit/s only

The flag FSSL indicates the presence or absence of a valid signal from the lobe as defined by 5.1.4.1. FSSL is set to 1 to indicate the absence of a valid signal when SMAC detects PM_STATUS.indication(Signal_detected=Signal_loss) for the entire period of timer TSSL (signal loss is filtered). FSSL is set to 0 to indicate the presence of a valid signal whenever SMAC detects PM_STATUS.indication(Signal_detected=Signal_acquired).

Flag, Station Signal Loss Detected (FSSLD), 4 Mbit/s and 16 Mbit/s only

The flag FSSLD is used to determine if the SMAC Signal Loss Filtering process is active or inactive. The Signal Loss Filtering process is used to determine whether or not the PHY signal loss (see 5.1.4.1) event is a steady-state condition. FSSLD is set to 1 to activate the Signal Loss Filtering process, if not already active whenever the SMAC detects PM_STATUS.indication(Signal_detected=Signal_loss). FSSLD is set to 0 to deactivate the Signal Loss Filtering process whenever the SMAC detects PM_STATUS.indication(Signal_detected=Signal_acquired).

Flag, Station Start Lobe Media Test (FSSLMT)

The flag FSSLMT is used to control the Lobe Media Test defined in 9.1.6.2.1 (FSLMTO=1). When FSSLMT=1, the LMT Notification Stage is active. When FSSLMT=0, the LMT Testing Stage is active.

The flag FSSLMT is set to 1 upon entry into the LMT Notification Stage. The flag FSSLMT is set to 0 upon successful completion of the LMT Notification Stage and starts the LMT Testing Stage.

Flag, Station Transmit Abort Sequence (FSTAS)

The flag FSTAS is used to control the counting of Abort Sequences. When the transmitter releases an Abort Sequence, it sets FSTAS to 1. The Error Handling Station Operation Table detects this condition and sets FSTAS to 0 and takes the appropriate action to increment the counter CSABE.

Flag, Station Transmit Idles (FSTI)

The flag FSTI is used to control the transmission of idles (Fill) as follows:

The TXI Access Protocol always has the flag FSTI is set to 1 (which indicates PS_CONTROL.request(Transmit_mode=Fill) — see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s, and 9.8.2.1.4 for 1000 Mbit/s) causing the Station to source fill except when the Transmit FSM is transmitting frame data (TS=STXD).

When the Station closes or starts the TKP Access Protocol, the flag FSTI is set to 0 (indicates PS_CONTROL.request (Transmit_mode=No_fill) — see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s and 9.8.2.1.4 for 1000 Mbit/s) to support the TKP Access Protocol.

Flag, Station Transmit from Crystal (FSTXC)

The flag FSTXC is used to select the Station's transmitter timing reference as follows:

4 Mbit/s and 16 Mbit/s

The setting of FSTXC controls the Station’s transmit clock and affects the PSC interface as follows:

— When FSTXC is 1, the PS_CONTROL.request(Crystal_transmit=Asserted) signal indicates that the Station’s SMAC transmit timing reference is derived from the Station’s internal crystal clock. Implementations of this standard may include an Elastic Buffer (5.8.3) and a Fixed Latency Buffer (5.8.2) with a latency of 24 symbols thus allowing ANSI/IEEE Std 802.5-1998 TKP implementations to function without hardware modification.

— When FSTXC is 0, the PS_CONTROL.request(Crystal_transmit=Not_asserted) indicates that the Station’s SMAC transmit timing reference is derived from the Station’s clock recovery circuit. There shall be no Elastic Buffer (5.8.3) or Fixed Latency Buffer (5.8.2) in the data path.

High Media Rate

FSTXC is set to 1 when the Connect.SMAC or Connect.PMAC (C-Port in Station Emulation Mode) condition occurs. When FSTXC is set to 1, the PS_CONTROL.request(Crystal_transmit=Asserted) (9.8.1.1.4 for 100 Mbit/s and 9.8.2.1.4 for 1000 Mbit/s) indicates that the Station's SMAC is deriving clock from its crystal clock as the transmit timing reference.

FSTXC is never set to 0 when operating at the High Media Rate.

Flag, Station Wire Fault (FSWF), only when Phantom Drive is active (FSPDA=1)

Flag FSWF is set to 1 to indicate wire fault is present and set to 0 to indicate no wire fault is present. [See 5.1.4.1 PM_STATUS.indication(Wire_fault.)]

Flag, Station Wire Fault Active (FSWFA), only when Phantom Drive is active (FSPDA=1)

The flag FSWFA is set to 1 to activate wire fault detection and is set to 0 to deactivate wire fault detection.

Flag, Transmit Idles (FTI), 4 Mbit/s and 16 Mbit/s only

The flag FTI is a TKP Access Protocol flag, defined by ISO/IEC 8802-5:1998 4.2.4.2, used to control the transmission of idles (Fill).

— When the flag FTI is set to 1, the MAC indicates PS_CONTROL.request(Transmit_mode=Fill), which causes the station to source fill rather than repeating the received data.

— When the flag FTI is set to 0, the MAC indicates PS_CONTROL.request(Transmit_mode=No_fill), which causes the station to repeat the received data.

9.2.4 SMAC States

There are a set of states for the Join Ring FSM, the Monitor FSM, and the Transmit FSM. A FSM can be in only one state at any instant in time.

9.2.4.1 Station Join States

The Station Join State (JS=) notation is used to identify the current state of the Station join FSM. The TXI Station's join state values are Bypass, Registration, Lobe Test, Duplicate Address Check, and Join Complete. Join states, listed by state value, are defined as follows:

Join State J0, Bypass (JS=BP)

This state is the rest state of the TXI Station. The only events recognized are the start signals, Connect.SMAC, or Connect.PMAC and FPOTO=0 which causes the Station to examine the flag, FSREGO to determine whether this is a DTR capable Station.

Join State JA, Station Registration (JS=SREG)

This state is entered when the Bypass state (JS=BP) detects a Connect.SMAC and FSREGO=1, or Connect.PMAC and FPOTO=0. This state determines in which mode the Station is to operate, either supporting the TXI or TKP Access Protocols. If the TXI Access Protocol is supported, this state sets certain parameters required by that protocol.

Join State JB, Station Lobe Test (JS=SLT)

This state is entered from either the Station Registration (JS=SREG) or the Station Join Complete (JS=SJC) and performs one of the two lobe test functions described in 9.1.6.

Join State JC, Station Duplicate Address Check (JS=SDAC)

This state is entered when the Lobe Test state (JS=SLT) successfully completes and causes the TXI Station to request insertion and start the TXI Heart Beat function. As a result of the Insert Request, the Station waits for the C-Port to respond with an Insert Response MAC frame. If the insert response indicates the Station's address is a duplicate to another Station within the DTR Concentrator's address domain, then the Station enters the Bypass state (JS=BP). If the insert response indicates the Station's address is unique within the DTR Concentrator's address domain, then the Station enters Join Complete (JS=SJC).

Join State JD, Station Join Complete (JS=SJC)

This state is entered when the Duplicate Address Check state (JS=SDAC) detects the C-Port has determined that the TXI Station has an unique address within the DTR Concentrator's address domain and is the completion of the Join Process.

Join State JE, Station High Media Rate Trade-up (JS=SHMRTU)

This state is entered when the Station's Registration state (JS=SREG) detects that the C-Port has agreed to its request to Trade-up from 4 Mbit/s or 16 Mbit/s operation to 100 Mbit/s operation and the Station has activated its 100 Mbit/s PHY.

— If the 100 Mbit/s Link Status becomes active before timer TSHMRW expires, then the Station enters the Registration state (JS=SREG) to restart the Registration state (JS=SREG) at 100 Mbit/s.

— If 100 Mbit/s Link Status fails to become active before the timer TSHMRW expires, then the Station enters the Bypass state (JS=BP).

Join State JF, Station Remove Alert Wait (JS=SRAW), High Media Rate only

This state is entered when the Station in the Join Complete state (JS=SJC) detects that it needs to enter the Bypass state (JS=BP) because of an error condition or a management action. The Remove Alert function allows the Station to notify the C-Port it is entering the Bypass state. The initial Remove Alert MAC frame is transmitted by the detection of any condition causing the Station to enter the Remove Alert Wait state. The counter CSRAT controls the number of Remove Alert MAC frames transmitted while in the Remove Alert Wait state. When counter CSRAT reaches zero, the Station enters the Bypass state.

9.2.4.2 Station Monitor States

The Monitor State (MS=) notation is used to identify the current state of the Station's Monitor FSM. The monitor state values are Operational, Transmit Beacon, Internal Test, and Wire Fault Delay.

The Station's Monitor States, listed by state value, are defined as follows:

Monitor State MA, Station Operational (MS=SOPT)

The Station Operational state is entered when the Join FSM transitions from its Duplicate Address Check state (JS=SDAC) to its Join Complete state (JS=SJC).

If, while in the Station Operational state, the Station detects a Heart Beat function failure and flag station operational (FSOP) is set to 1, then the Station sets FSOP to 0, resets the timers TSIT and TSLMT (synchronization for Hard Error Recovery), disables queued frame transmissions, and enters the Transmit Beacon state (MS=TSBN).

If, while in the Station Operational state, the Station receives a Beacon MAC frame from its C-Port (SA=SUA) and flag station operational (FSOP) is set to 1, the Station sets FSOP to 0, resets the timers TSIT and TSLMT (synchronization for Hard Error Recovery), disables queued frame transmissions, and enters the Wire Fault Delay state.

Monitor State MB, Station Transmit Beacon (MS=STBN)

The Station Transmit Beacon State causes the Station to transmit Beacon MAC frames with a Beacon Type set according to 9.1.10.1 until the timer, TSIT expires, indicating the Station is ready to execute its internal test and enter the Internal Test state (MS=SIT).

If, while in the Station Transmit Beacon state, the Station detects the reception of a Beacon MAC frame from its C-Port (SA=SUA), the Station resets its timers TSIT and TSLMT (synchronization for Hard Error Recovery), and enters the Wire Fault Delay state (MS=SWFD).

Monitor State MC, Station Internal Test (MS=SIT)

The Internal Test state is started when the Monitor's Transmit Beacon state (MS=STBN) or Wire Fault Delay state (MS=SWFD) indicates the Station has not detected a Wire Fault and is ready to execute its internal tests.

This state is not defined by this standard except that the Station shall determine whether it is capable of continuing to operate the TXI Access Protocol. The Internal Test performs the following actions depending on its success or failure:

a) Upon successful completion of the Internal Test, the Station waits for its timer TSLMT to expire before setting flag FSBNT to 1, causing the Join Machine to execute its Lobe Test (JS=SLT) and Duplicate Address Check (JS=SDAC) states.
b) Upon failure of the Internal Test, the Station's Join machine returns to the Bypass state (JS=BP).

If the Station's Internal Test was successful, the Internal Test state waits for the reception of the INS_RSP MAC frame indicating the C-Port has detected the successful completion of the Hard Error Recovery LMT and DAC functions, and then enters the Monitor's Operational state (MS=SOPT).

Monitor State MD, Station Wire Fault Delay State (MS=SWFD)

This state allows the Station's Wire-Fault detection process (if supported by the Station) to determine if a Wire Fault condition exists before entering its Internal Test state (MS=SIT). If a Wire Fault condition does exist, the Station removes from the link (JS=BP) and indicates to management the Wire Fault condition.

This state is started when one of the following occurs:

a) The SMAC in the Monitor Operational state (MS=SOPT) detects the reception of a Beacon MAC frame from its C-Port (SA=SUA) and the flag FSJC=1 (join complete).
b) The Beacon Transmit state (MS=STBN) detects the reception of a Beacon MAC frame from its C-Port (SA=SUA).

Either of these conditions causes the timers TSIT and TSLMT to be reset. The Station delays entry into the Internal Test state until timer TSIT expires (indicating the Station did not detect a Wire Fault condition).

9.2.4.3 Transmit States

The Transmit State (TS=) notation is used to identify the current state of the transmit FSM. The transmit state values are Transmit Normal and Transmit Frame Data. Transmit states, listed by state value, are defined as follows:

Transmit State TA, Transmit Normal (TS=STXN)

The transmit state TS=STXN is set when the transmit FSM enters its normal state of transmitting idles and is not transmitting (sourcing) frames.

At 100 Mbit/s, the PS_CONTROL.request(Transmit_mode=Fill) signal defined in 9.8.1.1.4 is used to transmit idles in this state.

At 1000 Mbit/s, the PS_CONTROL.request(Transmit_mode=Fill) signal defined in 9.8.2.1.4 is used to transmit idles in this state.

Transmit State TB, Transmit Frame Data (TS=STXD)

The transmit state TS=STXD is entered when the transmit FSM is transmitting the data portion of a frame (FC, DA, SA, RIF if present, INFO if present, and FCS fields).

At 100 Mbit/s, the PS_CONTROL.request(Transmit_mode=No_fill) signal defined in 9.8.1.1.4 turns off the transmission of idles and the frame's data is transmitted, one octet at a time, using the signal PS_UNITDATA.request(Tx_indication=Data_byte) defined in 9.8.1.1.2.

At 1000 Mbit/s, the PS_CONTROL.request(Transmit_mode=No_fill) signal defined in 9.8.2.1.4 turns off the transmission of idles and the frame's data is transmitted, one octet at a time, using the signal PS_UNITDATA.request(Tx_indication=Data_byte) defined in 9.8.2.1.2.

9.2.5 TXI Access Protocol SMAC Specification

This subclause specifies the procedures used in the Station Medium Access Control (SMAC) in support of the Station using the TXI Access Protocol using Station Operation Tables as follows:

a) The Station Join Station Operation—Table 9.2-1.
b) The Station Transmit Station Operation—Table 9.2-2.
c) The Station Monitor Station Operation—Table 9.2-3.
d) The Station Error Handling Station Operation—Table 9.2-4.
e) The Station Interface Signals Station Operation—Table 9.2-5.
f) The Station Miscellaneous Frame Handling Station Operation—Table 9.2-6.
g) The Station Lobe Media Test when FSLMTO=1 Station Operation—Table 9.2-7.

These Station Operation Tables use the term “Optional” as defined in 9.1.1.2.

Each Station Operation Table starting point has its event/condition shaded and each Station Operation Table exit point has its action/output shaded.

The DTR Station (FIPTXIS=0) supports the Bridge (M_UNITDATA), LLC (MA_UNITDATA), and Management (MGT_UNITDATA) Interfaces defined in 9.1.13.1, but has no access to the DTU (DTU_UNITDATA) or MRI (MRI_UNITDATA) Interfaces defined in 9.1.13.2.

The DTR C-Port in Station Emulation Mode (FIPTXIS=1) supports the DTU and MRI Interfaces defined in 9.1.13.2, but has no access to the Bridge, LLC or Management Interfaces defined in 9.1.13.1.

Parameters n6–n8 represent the initial value of the counters CSREQ, CSLTF, and CSRAT respectively to allow flexibility among station implementations.

Parameter	MIN	MAX	Used With	Description
n6	4	12	CSREQ	n6 is the initial setting of CSREQ which governs the maximum number of Registration Request Frames retransmitted by the Station. The maximum number of frames sent is (n6+1).
n7	1117	1123	CSLTF	n7 is the initial setting of CSLTF which governs the number of TEST MAC Frames transmitted by the Station’s LMT function when the policy flag FSLMTO=1 (see 9.1.6.2 for description). This form of LMT, specified by Table 9.2-7, is designed to support any media rate.
n8	5	10	CSRAT	n8 is the initial setting of CSRAT which governs the number of Remove Alert MAC Frames transmitted at the High Media Rate by the Station’s Remove Alert state (JS=SRAW) before exiting to the Bypass state (JS=BP).

9.2.5.1 Station Join — Station Operation Table

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
J0A	1001	**Connect.PMAC** & FPMRO<2 & FPOTO=0 & FSREGO=1 & JS=BP << This transition is executed by 9.3.4.1. >> << One of the Starting Points for the C-Port in Station Emulation Mode using the TXI Access Protocol. >> << For Information only. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1;FSMR=FPMRO; FPMR=FPMRO; FIPTXIS=1; TSIS=R
J0A	1007	**Connect.PMAC&** PS_STATUS.indication(Link_status=Asserted) & FPMRO>1 & FPOTO=0 & FSREGO=1& JS=BP << This transition is executed by 9.3.4.1. >> << This transition requires Link_status to be active *before* Connect.PMAC operates. >> << One of the Starting Points for the C-Port in Station Emulation Mode using the TXI Access Protocol. >> << For Information only. >> << High Media Rate only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1;FSMR=FPMRO; FPMR=FPMRO; FIPTXIS=1; TSIS=R
J0A	3108	**Connect.SMAC** & FSMRO<2 & FSREGO=1 & AND(SPV(AP_MASK),0002)=0002 & JS=BP << One of the Starting Points for the DTR Station using the TXI Access Protocol. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SREG;TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; FSMR=FSMRO; TSIS=R
J0A	3179	**Connect.SMAC** & PS_STATUS.indication (Link_status=Asserted)&FSMRO>1& FSREGO=1& AND(SPV(AP_MASK),0002)=0002 & JS=BP << This transition requires Link_status to be active *before* Connect.SMAC operates. >> << One of the Starting Points for the DTR Station using the TXI Access Protocol. >> << High Media Rate only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; FSMR=FSMRO; TSIS=R
	3170	**CSTFQ=0** & FSRRC=1 & FSMR<2 & JS=SDAC << 4 Mbit/s and 16 Mbit/s only >>	FSRRC=FSTXC=0 << Insert Request MAC frame has been transmitted, return to recovered clock. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JC0	3133	**Disconnect.SMAC** & FSMR<2 & JS=SDAC << Station told by Station Management to remove from the network. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station closed for unknown reason. >>
JC0	3152	**Disconnect.SMAC** & FSMR>1 & FSJC=0 & JS=SDAC << Station told by Station Management to remove from the network. >> << High Media Rate only >>	JS=BP << OPEN ERROR - Station closed for unknown reason. >>
JCF	3183	**Disconnect.SMAC** & FSMR>1 & FSJC=1 & JS=SDAC << Station told by Station Management to remove from the network. >> << High Media Rate only >>	JS=SRAW; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT << Station closed for unknown reason - start the Remove Alert process. >>
JD0C	3149	**Disconnect.SMAC** & FSMR<2 & JS=SJC << After Join Complete, Station told by Station Management to remove from the network. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP; Remove_station << Station closed for unknown reason. >>
JDFA	3180	**Disconnect.SMAC** & FSMR>1 & JS=SJC << After Join Complete, Station told by Station Management to remove from the network. >> << High Media Rate only >>	JS=SRAW; FSOP=0; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT; **If** FSPDA=1 then Remove_station << Station closed for unknown reason - start the Remove Alert process and if phantom drive is active, Remove_station. >>
JB0	3123	**Disconnect.SMAC** & FSMR<2 & JS=SLT << Station told by Station Management to remove from the network. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station closed for unknown reason. >>
JB0	3184	**Disconnect.SMAC** & FSMR>1 & FSJC=0 & JS=SLT << Station told by Station Management to remove from the network. >> << High Media Rate only >>	JS=BP << OPEN ERROR - Station closed for unknown reason. >>
JBF	3193	**Disconnect.SMAC** & FSMR>1 & FSJC=1 & JS=SLT << Station told by Station Management to remove from the network. >> << High Media Rate only >>	JS=SRAW; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT << Station closed for unknown reason - start the Remove Alert process. >>
JA0	3109	**Disconnect.SMAC** & JS=SREG << Station told by Station Management to remove from the network. >>	JS=BP << Station closed for unknown reason. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JB0	3164	**FR_AMP** & JS=SLT << A TXI Access Protocol error has been detected by the reception of a TKP AMP MAC frame prior to the activation of the TXI Heart Beat function. >>	JS=BP << OPEN ERROR = Protocol Error >>
JA0	3160	**FR_AMP** & JS=SREG << A TXI Access Protocol error has been detected by the reception of a TKP Access Protocol AMP MAC frame prior to the activation of the TXI Heart Beat function. >>	JS=BP << OPEN ERROR = Protocol Error >>
JC0	3134	**FR_BN** & JS=SDAC << TXI Access Protocol has detected the TKP Access Protocol is active by reception of a Beacon MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JA0	3110	**FR_BN** & JS=SREG << TXI Access Protocol has detected TKP Access Protocol is active by premature reception of a Beacon MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JB0	3124	**FR_BN(SA<>MA)** & JS=SLT << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Beacon MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JC0	3135	FR_CT & JS=SDAC << TXI Access Protocol has detected the TKP Access Protocol is active by reception of a Claim Token MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JD0A	3151	**FR_CT** & JS=SJC << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Claim Token MAC frame. >>	JS=BP; **If** FSPDA=1 then Remove_station << Protocol Error >>
JA0	3111	**FR_CT** & JS=SREG << TXI Access Protocol has detected TKP Access Protocol active by reception of a Claim Token MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JB0	3125	**FR_CT(SA<>MA)** & JS=SLT << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Claim Token MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JCD	3145	**FR_INS_RSP(DTR_RSP=0000)** & JS=SDAC << Response indicates C-Port has given permission for the TXI Station to complete Join. >>	JS=SJC; FSJC=FSOP=1; **If** FSECO=1 then (FSER=1; TSER=R); **If** FSPDA=1 then (INSERT; FSWFA=FSWF=0; TSWFD=R) << Start Error Report timer and if Phantom Drive is available then assert Phantom Drive and activate Wire Fault detection. >>
JC0	3138	**FR_INS_RSP(DTR_RSP=8020)** & JS=SDAC	JS=BP << OPEN ERROR = DAC Failure >>
JJC0	3112	**FR_MAC(SA<>MA & SA<>SUA & VC=00)** & JS=SDAC	JS=BP << OPEN ERROR = Protocol Error >>
JB0	3103	**FR_MAC(SA<>MA & SA<>SUA & VC=00)** & JS=SLT	JS=BP << OPEN ERROR = Protocol Error >>
JA0	3101	**FR_MAC(SA<>MA & SA<>SUA & VC=00)** & SUA<>0 & JS=SREG	JS=BP << OPEN ERROR = Protocol Error >>
JD0A	3146	FR_MAC(SA<>SUA & VC=00) & JS=SJC	JS=BP; **If** FSPDA=1 then Remove_station << Protocol Error >>
JC0	3137	**FR_MAC(SA<>SUA & VC=03)** & JS=SDAC	JS=BP << OPEN ERROR = Protocol Error >>
JD0A	3148	**FR_MAC(SA<>SUA & VC=03)** & JS=SJC	JS=BP; **If** FSPDA=1 then Remove_station << Protocol Error >>
JB0	3107	**FR_MAC(SA<>SUA & VC=03)** & JS=SLT	JS=BP << Protocol Error >>
JA0	3102	**FR_MAC(SA<>SUA & VC=03)** & SUA<>0 & JS=SREG	JS=BP << OPEN ERROR = Protocol Error >>
JC0	3136	**FR_PHB(SA<>SUA)** & JS=SDAC << A TXI Access Protocol error has been detected by the reception of a TXI Heart Beat or a TKP AMP MAC frame (SA<>SUA of the known C-Port). >>	JS=BP << OPEN ERROR = Protocol Error >>
JA0	3113	**FR_REG_RSP(AP_RSP=0000)** & FSMR<2 & FSHMRTUA=0 & FSRDO=1 & JS=SREG << Response MAC frame indicates the C-Port has rejected the Station's TXI Access Protocol request. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << OPEN ERROR = Protocol Error >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3150	**FR_REG_RSP(AP_RSP=0000)** & FSMR>1 & FSPDC=0 & JS=SREG << Response MAC frame indicates the C-Port has rejected the Station's TXI Access Protocol request to use Phantom Drive. Retry Registration request without Phantom Drive capability. >> << 100 Mbit/s only >>	FSPDC=1; FSPDA=0; CSREQ=n6; TSREQ=R; TXI_REG_REQ (AP_REQ=0002; IAC=SPV(IAC); PD=0002) << Request C-Port to use the TXI Access Protocol using no Phantom Drive. >>
JA0	3167	**FR_REG_RSP(AP_RSP=0000)** & FSMR>1 & FSPDC=1 & JS=SREG << Response MAC frame indicates the C-Port has rejected the Station's TXI Access Protocol request. >> << High Media Rate only >>	JS=BP << OPEN ERROR = Protocol Error >>
	3182	**FR_REG_RSP(AP_RSP=0000)** & FSMR<2 & FSHMRTUA=1 & JS=SREG << Response MAC frame indicates the C-Port has rejected the Station's TXI Access Protocol and trade up request. >> << 4 Mbit/s and 16 Mbit/s only >>	CSREQ=n6; TSREQ=R; FSPDA=1; FSHMRTUA=0; TXI_REG_REQ (AP_REQ=0002; IAC=SPV(IAC); PD=SPV(PD)) << Transmit Registration Request with the AP_REQ, IAC, and PD Subvectors setup. >>
JA1A	3105	**FR_REG_RSP(AP_RSP=0000)** & FSRDO=0 & FSHMRTUA=0 & FIPTXIS=0 & AND(SPV(AP_MASK),0001)=0001 & JS=SREG << The DTR Station's Registration request is denied by the C-Port, but Management has enabled the DTR Station to use the TKP Access Protocol. >> << **Note:** FSRDO=1 is required for the High Media Rate. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=LT; FSTXC=FSTI=0; FTI=*x*; Set_initial_conditions; TEST << The DTR Station starts the TKP Access Protocol and exits to 9.6. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JA1B	3158	**FR_REG_RSP(AP_RSP=0000)** & FSRDO=0 & FSHMRTUA=0 & FIPTXIS=1 & AND(SPV(AP_MASK),0001)=0001 & JS=SREG << The C-Port in Station Emulation Mode Registration request is denied by the C-Port, but Management has enabled the C-Port in Station Emulation Mode to use the TKP Access Protocol. >> << **Note:** FSRDO=1 is required for the High Media Rate. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=LT; FSTXC=FSTI=0; FTI=x; FIPTXIS=0; FIPTKPS=1; Set_initial_conditions; TEST << The C-Port in Station Emulation Mode starts the TKP Access Protocol and exits to 9.5. >>
	3106	**FR_REG_RSP(AP_RSP=0002)** & FSREGO=1 & JS=SREG << Response indicates C-Port is supporting the TXI Access Protocol. Station remains in this state until timer TSLMTD expires. >>	FSRC=1; TSLMTD=R; SUA=SA << Registration complete. >>
JAE	3178	**FR_REG_RSP(AP_RSP=0004)** & FSREGO=1 & JS=SREG << Response indicates C-Port is supporting 100 Mbit/s and the Station has requested the C-Port to support the 100 Mbit/s operation (FSHMRTUO=1) if supported. >>	JS=SHMRTU; TSHMRW=R; Flush_transmit_queues; PS_CONTROL.request (Initialize, Media_rate=2) << Station activates the 100 Mbit/s link and enters the High Media Rate Wait state waiting for Link activation as follows: • If Link activation occurs before timer TSHMRW expires, then enter the Registration state (JS=SREG). • If timer TSHMRW expires before Link activation occurs, then enter the Bypass state (JS=BP). >>
JC0	3139	**FR_REMOVE(DA=Non_broadcast)** & FSMR<2 & FSRRO=0 & JS=SDAC << Station told by Network Management to remove from the network. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << OPEN ERROR = Remove Station Received >>
JC0	3198	**FR_REMOVE(DA=Non_broadcast)** & FSMR>1 & FSJC=0 & FSRRO=0 & JS=SDAC << Station told by Network Management to remove from the network. >> << High Media Rate only >>	JS=BP << OPEN ERROR—Remove Station Received >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JCF	3196	**FR_REMOVE(DA=Non_broadcast)** & FSMR>1 & FSJC=1 & FSRRO=0 & JS=SDAC << Station told by Network Management to remove from the network. >> << High Media Rate only >>	JS=SRAW; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT << Remove Station Received — start the Remove Alert process
JD0C	3153	**FR_REMOVE(DA=Non_broadcast)** & FSMR<2 & FSRRO=0 & JS=SJC << Station told by Network Management to remove from the network after Join Complete. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP; Remove_station << Remove Station Received. >>
JDFA	3185	**FR_REMOVE(DA=Non_broadcast)** & FSMR>1 & FSRRO=0 & JS=SJC << Station told by Network Management to remove from the network after Join Complete. >> << High Media Rate only >>	JS=SRAW; FSOP=0; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT; **If** FSPDA=1 then Remove_station << Remove Station Received – start the Remove Alert process and if phantom drive is active, Remove_station. >>
JB0	3126	**FR_REMOVE(DA=Non_broadcast)** & FSMR<2 & FSRRO=0 & JS=SLT << Station told by Network Management to remove from the network. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << OPEN ERROR = Remove Station Received >>
JB0	3199	**FR_REMOVE(DA=Non_broadcast)** & FSMR>1 & FSJC=0 & FSRRO=0 & JS=SLT << Station told by Network Management to remove from the network. >> << High Media Rate only >>	JS=BP << OPEN ERROR = Remove Station Received. >>
JBF	3197	**FR_REMOVE(DA=Non_broadcast)** & FSMR>1 & FSJC=1 & FSRRO=0 & JS=SLT << Station told by Network Management to remove from the network. >> << High Media Rate only >>	JS=SRAW; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT << Remove Station Received – start the Remove Alert process. >>
JA0	3115	**FR_REMOVE(DA=Non_broadcast)** & FSRRO=0 & JS=SREG << Station told by Network Management to remove from the network. >>	JS=BP << OPEN ERROR = Remove Station Received >>
JC0	3186	**FR_RMV_ALRT(VC=03 & SA=SUA)** & FSMR>1 & JS=SDAC << C-Port signals Station it is entering its Bypass state (JS=BP). >> << High Media Rate only >>	JS=BP << C-Port is not operational. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JD0A	3171	**FR_RMV_ALRT(VC=03 & SA=SUA)** & FSMR>1 & JS=SJC << C-Port signals Station it is entering JS=BP. >> << High Media Rate only >>	JS=BP; **If** FSPDA=1 then Remove_station << C-Port is not operational. >>
JB0	3001	**FR_RMV_ALRT(VC=03 & SA=SUA)** & FSMR>1 & JS=SLT << C-Port signals Station it is entering its Bypass state (JS=BP). >> << High Media Rate only >>	JS=BP << C-Port is not operational. >>
JC0	3140	**FR_RP** & JS=SDAC << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Ring Purge MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JD0A	3154	**FR_RP** & JS=SJC << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Ring Purge MAC frame. >>	JS=BP; **If** FSPDA=1 then Remove_station << Protocol Error >>
JA0	3116	**FR_RP** & JS=SREG << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Ring Purge MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error>>
JB0	3127	**FR_RP(SA<>MA)** & JS=SLT << TXI Access Protocol has detected TKP Access Protocol is active by reception of a Ring Purge MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JD0A	3163	FR_SMP & JS=SJC << TXI Access Protocol detects TKP Access Protocol is active by reception of a SMP MAC frame after Join complete. >>	JS=BP; **If** FSPDA=1 then Remove_station << Protocol Error >>
JA0	3161	**FR_SMP** & JS=SREG << TXI Access Protocol detects TKP Access Protocol active by reception of a SMP MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>
JC0	3162	**FR_SMP(SA<>MA)** & JS=SDAC << TXI Access Protocol detects TKP Access Protocol active by reception of a SMP MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error>>
JB0	3165	**FR_SMP(SA<>MA)** & JS=SLT << TXI Access Protocol detects TKP Access Protocol is active by reception of a SMP MAC frame. >>	JS=BP << OPEN ERROR = Protocol Error >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JDB	3114	**FSBNT=1** & MS=SIT & JS=SJC << Monitor requests Join to run the Station's LMT and sets Beacon Test request flag inactive. >>	JS=SLT; FSBNT=0; **If** FSMR<2 then FSTXC=1; TSLMTC=R; **If** FSLMTO=0 then TXI_TEST; **If** FSLMTO=1 then FSRLMT=1 << Start the Lobe Media Test Completion Timer and if • FSLMTO=0 then start the Lobe Media Test defined by 9.1.6.1 or • FSLMTO=1 then start the Lobe Media Test defined by 9.1.6.2 and Table 9.2-7. >>
JC0	3142	**FSBPF=1** & TS=STXN & JS=SDAC	JS=BP << Station Fault, Transmit Error. >>
JD0A	3156	**FSBPF=1** & TS=STXN & JS=SJC	JS=BP; **If** FSPDA=1 then Remove_station << Station Fault, Transmit Error. >>
JB0	3129	**FSBPF=1** & TS=STXN & JS=SLT	JS=BP << Station Fault, Transmit Error. >>
JF0	3002	**FSBPF=1** & TS=STXN & JS=SRAW	JS=BP << Station Fault, Transmit Error. >>
JA0	3118	**FSBPF=1** & TS=STXN & JS=SREG	JS=BP << Station Fault, Transmit Error.>>
	3166	**FSIRD=1** & TS=STXN & JS=SDAC << Insert Request MAC frame delayed until transmitter has no frames being transmitted (TS=STXN). >> << 4 Mbit/s and 16 Mbit/s only >>	FSIRD=0; FSRRC=FSTXC=1; CSTFQ=(CSTFQ+1); TSIP=R; TXI_INS_REQ << Transmit an Insert Request MAC frame using crystal transmit. >>
JB0	3189	**FSLMTF=1** & FSJC=0 & JS=SLT << Reason for LMT failure is determined when FSLMTF is set to 1 (see Table 9.2-7). >>	JS=BP << OPEN ERROR – Lobe Media Test failure before join has completed. >>
JB0	3191	**FSLMTF=1** & FSJC=1 & FSMR<2 & JS=SLT << Reason for LMT failure is determined when FSLMTF is set to 1 (see Table 9.2-7). >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Hard Error Recovery Lobe Media Test failure – enter Bypass. >>
JBF	3188	**FSLMTF=1** & FSJC=1 & FSMR>1 & JS=SLT << Reason for LMT failure is determined when FSLMTF is set to 1 (see Table 9.2-7). >> << High Media Rate only >>	JS=SRAW; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT << Hard Error Recovery Lobe Media Test failure – start the Remove Alert process. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JBCB	3190	**FSLMTS=1** & JS=SLT << Lobe Media Test function completed successfully, set Station's LMT functional address inactive and request Insertion. >>	JS=SDAC; FA(TEST)=0; **If** FSJC=0 then MS=SOPT; FSLMTS=0; FSHBA=FSRRC=1; **If** FSMR<2 then FSTXC=1; CSTFQ=1; TSJC=R; TSQHB=R;TSRHB=R; TSIP=R; TXI_INS_REQ
JC0	3141	**INTERNAL_ERR(not_correctable)** & JS=SDAC	JS=BP << OPEN ERROR = Station Fault, Internal Station Error. >>
JD0A	3155	**INTERNAL_ERR(not_correctable)** & JS=SJC	JS=BP; **If** FSPDA=1 then Remove_station << Station Fault, Internal Station Error. >>
JB0	3128	**INTERNAL_ERR(not_correctable)** & JS=SLT	JS=BP << OPEN ERROR = Station Fault, Internal Station Error. >>
JA0	3117	**INTERNAL_ERR(not_correctable)** & JS=SREG	JS=BP << OPEN ERROR = Station Fault, Internal Error. >>
JD0B	3147	**INTERNAL_TEST_FAILURE** & MS=SIT & JS=SJC	JS=BP << Station Fault, Internal Test failure. >>
JEA	3194	**PS_STATUS.indication (Link_status=Asserted)** & JS=SHMRTU << Station detects Trade-up to 100 Mbit/s and restarts registration. >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; FSMR=2; **If** FIPTXIS=1 then FPMR=2; TSIS=R << Set internal media rate flag(s) to 100 Mbit/s. >>
JC0	3172	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=SDAC << C-Port link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP << C-Port/Station link not operational. >>
JD0A	3173	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=SJC << C-Port link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP; **If** FSPDA=1 then Remove_station << Remove Alert MAC frame is not sent because the C-Port/Station link not operational. >>
JF0	3187	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=SRAW << C-Port link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP << Remove Alert MAC frame is not sent because the C-Port/Station link is not operational. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JB0	3174	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=SLT << High Media Rate only >>	JS=BP << C-Port/Station link not operational. >>
JA0	3175	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=SREG << High Media Rate only >>	JS=BP << C-Port/Station link not operational. >>
JB0	3130	**TEST_FAILURE** & JS=SLT << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << OPEN ERROR = Lobe Test Failure >>
JBCA	3132	**TEST_OK** & JS=SLT << TXI Station's LMT completed successfully and causes setup for TXI Station insertion. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SDAC; **If** FSJC=0 then MS=SOPT; FSHBA=FSRRC=FSTXC=1; CSTFQ=1; TSJC=R; TSQHB=R; TSRHB=R; TSIP=R; TXI_INS_REQ
JE0	3195	**TSHMRW=E** & PS_STATUS.indication (Link_status=Not_asserted) & JS=SHMRTU << Station failed to detect Link activation in time allotted. >>	JS=BP << OPEN ERROR – Trade-up failure. >>
	3104	**TSIP=E** & JS=SDAC & FSMR<2 << 4 Mbit/s and 16 Mbit/s only >>	FSIRD=1 << Remember the TSIP=E event and delay the transmission of the Insert Request MAC frame until crystal clock is available. >>
	3168	**TSIP=E** & JS=SDAC & FSMR>1 << High Media Rate only >>	TSIP=R; TXI_INS_REQ << No delay is required since crystal clock is available. Transmit Insert Request MAC frame. >>

	3119	TSIS=E & FSMR<2 & JS=SREG
		<< DTR Station makes its first request for TXI Access Protocol setup by setting subvector values for the REG_REQ_MAC frame and then queues the frame for transmission. >>
		<< Request Trade-up to the High Media Rate if the Trade-up policy is enabled. >>
		<< **NOTE:**
		4 Mbit/s and 16 Mbit/s requires Phantom Drive to be active (SPV(PD)=0001). >>
		<< 4 Mbit/s and 16 Mbit/s only >>
			CSREQ=n6; TSREQ=R; FSPDA=1;
			FSHMRTUA=FSHMRTUO;
			TXI_REG_REQ
			If FSHMRTUO=0 then
			AP_REQ=0002;
			If FSHMRTUO=1 then
			AP_REQ=0006;
			IAC=SPV(IAC);
			PD=SPV(PD))
			<< Transmit Registration Request with the AP_REQ, IAC and PD Subvectors setup. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3177	TSIS=E & FSMR>1 & JS=SREG << DTR Station makes its first request for TXI Access Protocol setup by setting subvector values for the REG_REQ_MAC frame and then queues the frame for transmission. >> << **NOTE:** 100 Mbit/s allows Phantom Drive to be active (SPV(PD)=0001) or inactive (SPV(PD)=0002). 1000 Mbit/s requires Phantom Drive to be inactive (SPV(PD)=0002). >> << High Media Rate only >>	CSREQ=n6; TSREQ=R; **If** SPV(PD)=0001 then FSPDA=1; **If** SPV(PD)=0002 then (FSPDC=1; FSPDA=0); TXI_REG_REQ (AP_REQ=0002; IAC=SPV(IAC); PD=SPV(PD)) << Setup Phantom Drive control and then transmit Registration Request with the AP_REQ, IAC, and PD Subvectors setup. >>
JC0	3143	**TSJC=E** & JS=SDAC	JS=BP << OPEN ERROR = Join Time-out Error >>
JB0	3131	**TSLMTC=E** & JS=SLT << Time allotted for Station's TXI LMT has been exceeded. >>	JS=BP << OPEN ERROR = Station Fault, Lobe Test Completion Time Exceeded >>
JAB	3121	**TSLMTD=E** & JS=SREG << Station's TXI LMT Delay completed. >>	JS=SLT; TSLMTC=R; **If** FSLMTO=0 then TXI_TEST; **If** FSLMTO=1 then FSRLMT=1 << Start the Lobe Media Test Completion Timer and if • FSLMTO=0, then start the Lobe Media Test defined by 9.1.6.1 or • FSLMTO=1, then start the Lobe Media Test defined by 9.1.6.2 and Table 9.2-7. >>
	3176	**TSRAP=E** & CSRAT<>0 & JS=SRAW << Transmission of Remove Alert MAC Frame has not been completed. >> << High Media Rate only >>	CSRAT=(CSRAT-1); TSRAP=R; TXI_RMV_ALRT << Retransmit Remove Alert MAC Frame. >>
JF0	3192	**TSRAP=E** & CSRAT=0 & JS=SRAW << Transmission of Remove Alert MAC Frame has been completed. >> << High Media Rate only >>	JS=BP << Enter the Bypass state for reason that started timer TSRAP. >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JA1A	3120	**TSREQ=E** & CSREQ=0 & FSRC=0 & FSOPO=0 & FIPTXIS=0 & AND(SPV(AP_MASK),0001)=0001 & JS=SREG << C-Port has failed to respond to multiple REG_REQ MAC frames and this Station permits the Emulation of the TKP Access Protocol. >> << **NOTE:** FSOPO=0 is never true for the High Media Rate so a test for FSMR is not required.>> << 4 Mbit/s and 16 Mbit/s only >>	JS=LT; FSTXC=FSTI=0; FTI=*x*; Set_initial_conditions; TEST << DTR Station starts the TKP Access Protocol and exits to 9.6. >>
JA1B	3159	**TSREQ=E** & CSREQ=0 & FSRC=0 & FSOPO=0 & FIPTXIS=1 & AND(SPV(AP_MASK),0001)=0001 & JS=SREG << Attached C-Port has failed to respond to multiple REG_REQ MAC frames and the TKP Access Protocol Emulation is permitted by this C-Port. >> << **NOTE:** FSOPO=0 is never true for the High Media Rate so a test for FSMR is not required. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=LT; FSTXC=FSTI=0; FTI=*x*; FIPTXIS=0; FIPTKPS=1; Set_initial_conditions; TEST << C-Port in Station Emulation Mode starts the TKP Access Protocol and exits to 9.5. >>
JA0	3169	**TSREQ=E** & CSREQ=0 & FSRC=0 & FSOPO=1 & JS=SREG << C-Port has failed to respond to multiple REG_REQ MAC frames and TKP Access Protocol Emulation is not permitted by this Station. >>	JS=BP << OPEN ERROR = Protocol Error>>
	3122	**TSREQ=E** & CSREQ>0 & FSRC=0 & JS=SREG << DTR Station makes *another* request for TXI Access Protocol setup by setting subvector values for the REG_REQ_MAC frame allowing Phantom Drive (4, 16, or 100 Mbit/s) or no Phantom Drive (100 Mbit/s or 1000 Mbit/s) and then queues the frame for transmission. >> << Request Trade-up to 100 Mbit/s if Station's Trade-up policy is enabled, and Media Rate is 4 Mbit/s or 16 Mbit/s. >>	CSREQ=(CSREQ-1); TSREQ=R; TXI_REG_REQ (**If** FSMR>1 then AP_REQ=0002; **If** (FSMR<2 & FSHMRTUA=0 then AP_REQ=0002); **If** (FSMR<2 & FSHMRTUA=1 then AP_REQ=0006); IAC=SPV(IAC); **If** FSPDA=0 then PD=0002; **If** FSPDA=1 then PD=0001) << Transmit Registration Request with the REQ, IAC, and PD Subvector setup. >>
JC0	3144	**TSRHB=E** & JS=SDAC <<TXI Access Protocol has detected absence of the Heart Beat MAC frame prior to Join complete. >>	JS=BP << OPEN ERROR = Protocol Error >>

Table 9.2-1—Station Join Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
J9A	6007	**TSRW=E** & FIPTKPS=0 & FSREGO=1 & JS=SRW << One of the Starting Points for the DTR Station using the TXI Access Protocol. >> << This Transition is executed by 9.6.2.1. >> << DTR Station originally opened using the TKP Access Protocol and then recognizes the attached C-Port's request to use the TXI Access Protocol. >> << Registration Query Protocol. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; TSIS=R << For Information only. >>
J9A	6006	**TSRW=E** & FIPTKPS=1 & FSREGO=1 & JS=SRW << One of the Starting Points for the C-Port in Station Emulation Mode using the TXI Access Protocol. >> << This Transition is executed by 9.5.4.2. >> << C-Port in Station Emulation Mode originally opened using the TKP Access Protocol and then recognizes the attached C-Port's request to use the TXI Access Protocol. >> << Registration Query Protocol >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; TSIS=R; FIPTKPS=0; FIPTXIS=1 << For Information only. >>
JD0C	3157	TSWF=E & FSWFA=1 & FSWF=1 & FSMR<2 & JS=SJC << Occurs only when Phantom Drive is active. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP; Remove_station << Wire Fault Detected – caused by Station, Lobe, or Port fault. >>
JDFB	3181	TSWF=E & FSWFA=1 & FSWF=1 & FSMR>1 & JS=SJC << Occurs only when Phantom Drive is active. >> << 100 Mbit/s only >>	JS=SRAW; FSOP=0; CSRAT=n8; TSRAP=R; TXI_RMV_ALRT; Remove_station << Wire Fault Detected – caused by Station, Lobe, or Port fault – start the Remove Alert process and remove station. >>

9.2.5.2 Station Transmit—Station Operation Table

Table 9.2-2—Station Transmit Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TBAA	3207	**CSBTX>SPV(MAX_TX)** & FSMR<2 & FPASO=0 & FIPTXIS=1 & TS=STXD << C-Port in Station Emulation Mode has detected maximum frame size has been exceeded. >> << 4 Mbit/s and 16 Mbit/s only >>	[TS=STXN; TX_AB; FSTAS=FSTI=1 (optional-unk)] << Terminate the transmission of the frame by transmitting an Abort Sequence. >>
TBAE	3204	**CSBTX>SPV(MAX_TX)** & FSMR<2 & FPASO=1 & FIPTXIS=1 & TS=STXD << C-Port in Station Emulation Mode has detected maximum frame size has been exceeded. >> << 4 Mbit/s and 16 Mbit/s only >>	[TS=STXN; FSTAS=FSTI=1; TX_INV_FCS; TX_EFS(I=0; E=1) (optional-unk)] << Terminate the transmission of the frame by transmitting an Invalid FCS and setting the E bit to one. >>
TBAJ	3213	**CSBTX>SPV(MAX_TX)** & FSMR>1 & FIPTXIS=1 & TS=STXD << C-Port in Station Emulation Mode has detected maximum frame size has been exceeded. >> << High Media Rate only >>	TS=STXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then [TX_INV_FCS; TX_EFS(E=1) (optional-unk)]; FSTAS=FSTI=1 << Terminate the transmission of the frame by transmitting either an Abort Sequence or an Invalid FCS and setting the E bit to one. >>
TBAF	3212	**DTU_UNITDATA-STATUS.request(Fail)** & FSMR<2 & FPTX_LTH=0 & FIPTXIS=1 & TS=STXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a Cut-through frame is being transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; TX_AB; FSTAS=FSTI=1 << The Cut-through frame has completed with a Fail status and the frame is aborted by transmitting an Abort Sequence. >>
TBAK	3214	**DTU_UNITDATA-STATUS.request(Fail)** & FSMR>1 & FPTX_LTH=0 & FIPTXIS=1 & TS=STXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a Cut-through frame is being transmitted. >> << High Media Rate only >>	TS=STXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FSTAS=FSTI=1 << Terminate the transmission of the frame by transmitting either an Abort Sequence or an Invalid FCS and setting the E bit to one. >>
	3208	**EOB** & TS=STXD & FIPTXIS=1 << Occurs *once* for each byte transmitted during the Transmit Data state (TS=STXD). >> << C-Port in Station Emulation Mode support. >>	[CSBTX=(CSBTX+1) (optional-unk)]

Table 9.2-2—Station Transmit Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TBAB	3205	**EOD** & FSMR<2 & TS=STXD << The last octet of the Frame's Information Field has been transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; TX_FCS; TX_EFS(I=E=0); FSTI=1; **If** JS=SDAC then CSTFQ=(CSTFQ-1)
TBAM	3221	**EOD** & FSMR>1 & TS=STXD << The last octet of the Frame's Information Field has been transmitted. >> << High Media Rate only >>	TS=STXN; TX_FCS; TX_EFS(E=0); FSTI=1
TABA	3203	**PDU_QUEUED** & FSBPF=0 & FSOP=1 & FIPTXIS=0 & TS=STXN << Queued frame is transmitted by the Station only when FSOP=1. >>	TS=STXD; FSTI=0; TX_SFS(P=*x*; R=0) << Frame length for a frame in the TXI queue is always known. >>
TABB	3210	**PDU_QUEUED** & FSBPF=0 & FSOP=1 & FIPTXIS=1 & TS=STXN << Queued frame is transmitted by the C-Port only when FSOP=1. >>	TS=STXD; FSTI=0; **If** FR_LTH<=PPV(MAX_TX,) then FPTX_LTH=1; **If** FR_LTH=UNK, then FPTX_LTH=0; **If** FSMR=0 then CSBTX=9; **If** FSMR=1 then CSBTX=D; **If** FSMR=2 then CSBTX=14; **If** FSMR=3 then CSBTX=18; TX_SFS(P=*x*; R=0) << The frame length of the queued frame is either unknown or a value less than PPV(MAX_TX). >>
TBAC	3216	**PORT_ERR(correctable)** & FIPTXIS=1 & FPMR<2 & TS=STXD << C-Port could not complete transmission of frame being transmitted - abort frame. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; TX_AB; FSTAS=FSTI=1; **If** JS=SDAC then CSTFQ=(CSTFQ-1) << Transmit Abort sequence. >>
TBAG	3215	**PORT_ERR(correctable)** & FIPTXIS=1 & FPMR>1 & TS=STXD << C-Port could not complete transmission of frame being transmitted — abort frame. >> << High Media Rate only >>	TS=STXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FSTAS=FSTI=1 << Terminate the transmission of the frame by transmitting either an Abort Sequence or an Invalid FCS and setting the E bit to one. >>
TBAL	3217	**PORT_ERR(not_correctable)** & FIPTXIS=1 & FPMR<2 & TS=STXD << C-Port could not complete transmission of frame being transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; [TX_AB (optional)]; FSBPF=FSTI=1 << Optionally Transmit Abort sequence. >>

Table 9.2-2—Station Transmit Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TBAH	3218	**PORT_ERR(not_correctable)** & FIPTXIS=1 & FPMR>1 & TS=STXD << C-Port could not complete transmission of frame being transmitted. >> << High Media Rate only >>	TS=STXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FSBPF=FSTI=1 << Terminate the transmission of the frame by transmitting either an Abort Sequence or an Invalid FCS and setting the E bit to one and then force C-Port to the Bypass state. >>
TBAC	3206	**STATION_ERR(correctable)** & FIPTXIS=0 & FSMR<2 & TS=STXD << Station could not complete transmission of frame: enter the Transmit Normal state. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; TX_AB; FSTAS=FSTI=1; **If** JS=SDAC then CSTFQ=(CSTFQ-1) << Transmit Abort Sequence. >>
TBAG	3219	**STATION_ERR(correctable)** & FIPTXIS=0 & FSMR>1 & TS=STXD << Station could not complete transmission of frame: enter the Transmit Normal state. >> << High Media Rate only >>	TS=STXN; **If** FSASO=0 then TX_AB; **If** FSASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FSTAS=FSTI=1 << Terminate the transmission of the frame by transmitting either an Abort Sequence or an Invalid FCS and setting the E bit to one. >>
TBAD	3209	**STATION_ERR(not_correctable)** & FSMR<2 & FIPTXIS=0 & TS=STXD << Station could not complete transmission of frame: enter the Transmit Normal state. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=STXN; [TX_AB (optional-I)]; FSBPF=FSTI=1 << Optionally Transmit Abort Sequence. Force Join to enter the Bypass state. >>
TBAH	3220	**STATION_ERR(not_correctable)** & FSMR>1 & FIPTXIS=0 & TS=STXD << Station could not complete transmission of frame: enter the Transmit Normal state. >> << High Media Rate only >>	TS=STXN **If** FSASO=0 then TX_AB; **If** FSASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FSBPF=FSTI=1 << Terminate the transmission of the frame by transmitting an Invalid FCS and setting the E bit to one and Force Join to enter the Bypass state. >>
TABA	3202	**TXI_REQ** & FIPTXIS=0 & FSBPF=0 & TS=STXN << SMAC TXI_(frame) is being transmitted. >>	TS=STXD; FSTI=0; TX_SFS(P=*x*; R=0) << Frame length for a frame in the TXI queue is always known. >>

Table 9.2-2—Station Transmit Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TABC	3211	TXI_REQ & FIPTXIS=1 & FPBPF=0 & TS=PTXN << PMAC TXI_(frame) is being transmitted. >>	TS=STXD; FSTI=0; FPTX_LTH=1; **If** FSMR=0 then CSBTX=9; **If** FSMR=1 then CSBTX=D; **If** FSMR=2 then CSBTX=14; **If** FSMR=3 then CSBTX=18; TX_SFS(P=*x*; R=0) << Frame length for a frame in the TXI queue is always known. >>

9.2.5.3 Station Monitor—Station Operation Table

Table 9.2-3—Station Monitor Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
MAD	3316	**FR_BN(SA=SUA)** & FSJC=1 & MS=SOPT << Station received a Beacon MAC frame from its C-Port and starts Hard Error Recovery by entering the Wire Fault Delay state. >>	MS=SWFD; FSHBA=FSOP=0; TSIT=R; TSLMT=R
MBD	3318	**FR_BN**(SA=SUA) & MS=STBN << Station received a Beacon MAC frame from its C-Port and continues Hard Error Recovery by entering the Wire Fault Delay state. >>	MS=SWFD; TSIT=R; TSLMT=R
MCA	3319	**FR_INS_RSP(DTR_RSP=0000)** & MS=SIT << The Station's Internal Test was successful and it transmitted an Insert Request. This frame's reception indicates the C-Port has authorized Insertion. >>	MS=SOPT
	3323	**FR_PHB(SA=SUA)** & FSHBA=1 << C-Port Heart Beat MAC frame received. >>	TSRHB=R << Reset the Heart Beat timer. >>
MBC	3317	TSIT=E & MS=STBN << Station has completed waiting for Wire-Fault Detection. >>	MS=SIT; **If** FSPDA=1 then Remove_station; INT_TEST
MDC	3320	**TSIT=E** & MS=SWFD << Station has completed waiting for Wire-Fault Detection. >>	MS=SIT; **If** FSPDA=1 then Remove_station; INT_TEST
	3322	**TSLMT=E** & MS=SIT << Lobe Test to be executed by the Station. >>	FSBNT=1 << Request Join to execute JS=SLT. >>

Table 9.2-3—Station Monitor Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3324	TSQHB=E & FSHBA=1 & FSMR<2 << Station's Heart Beat timer causes transmission of SHB_PDU. >> << 4 Mbit/s and 16 Mbit/s only >>	TSQHB=R; TXI_SHB **If** JS=SDAC then CSTFQ=(CSTFQ+1)
	3303	**TSQHB=E** & FSHBA=1 & FSMR>1 << Station's Heart Beat timer causes transmission of SHB_PDU. >> << High Media Rate only >>	TSQHB=R; TXI_SHB
	3313	**TSQP=E** & MS=STBN << Pacing timer for Beacon MAC frames has expired, transmit another Beacon MAC frame. >>	TSQP=R; **If** FSSL=0 then TXI_BN(BN_TYPE=5); **If** FSSL=1 then TXI_BN(BN_TYPE=2) << BN_TYPE=5 for High Media Rate. >> << BN_TYPE=(2 or 5) for any media rate. >>
MAB	3314	**TSRHB=E** & FSJC=1 & MS=SOPT << Heart Beat Failure detected. Station starts Hard Error Recovery by entering the Beacon Transmit state. >>	MS=STBN; FSHBA=FSOP=0; FSTXC=1; TSIT=R; TSLMT=R; TSQP=R; **If** FSSL=0 then TXI_BN(BN_TYPE=5); **If** FSSL=1 then TXI_BN(BN_TYPE=2) << BN_TYPE=5 for High Media Rate. >> << BN_TYPE=(2 or 5) for any media rate. >>

9.2.5.4 Station Error Handling—Station Operation Table

Table 9.2-4—Station Error Handling Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3401	**Burst5_error_event** & CSBE<FF & FSJC=1 & FSER=1 & MS=SOPT << 4 Mbit/s and 16 Mbit/s event only. >>	CSBE=(CSBE+1)
	3402	**Burst5_error_event** & FSJC=1 & FSER=0 & MS=SOPT << 4 Mbit/s and 16 Mbit/s event only. >>	FSER=1; TSER=R; CSBE=(CSBE+1)
	3407	**FR_NOT_COPIED** & CSRCE<FF & FSJC=1 & FSER=1 & MS=SOPT	CSRCE=(CSRCE+1)
	3408	**FR_NOT_COPIED** & FSJC=1 & FSER=0 & MS=SOPT	FSER=1; TSER=R; CSRCE=(CSRCE+1)
	3409	**FR_WITH_ERR(E=0)** & CSLE<FF & FSJC=1 & FSER=1 & MS=SOPT	CSLE=(CSLE+1)
	3410	**FR_WITH_ERR(E=0)** & FSJC=1 & FSER=0 & MS=SOPT	FSER=1; TSER=R; CSLE=(CSLE+1)
	3417	**FSTAS=1** & TS=STXN & CSABE<FF & FSJC=1 & FSER=1 & MS=SOPT << Transmitter has released an Abort Sequence. >>	FSTAS=0; CSABE=(CSABE+1)
	3418	FSTAS=1 & TS=STXN & FSJC=1 & FSER=0 & MS=SOPT	FSTAS=0; FSER=1; TSER=R; CSABE=(CSABE+1)
	3411	**INTERNAL_ERR(correctable)** & CSIE<FF & FSJC=1 & FSER=1 & MS=SOPT	CSIE=(CSIE+1)
	3412	**INTERNAL_ERR(correctable)** & FSJC=1 & FSER=0 & MS=SOPT	FSER=1; TSER=R; CSIE=(CSIE+1)
	3426	**PM_STATUS.indication (Signal_detection=signal_acquired)** & FSSLD=1 << 4 Mbit/s and 16 Mbit/s event only. >>	FSSL=FSSLD=0
	3427	**PM_STATUS.indication (Signal_detection=signal_loss)** & FSSLD=0 << 4 Mbit/s and 16 Mbit/s event only. >>	FSSLD=1; TSSL=R
	3428	**PM_STATUS.indication (Wire_fault=Detected)** & FSWFA=1 & FSWF=0 << Occurs only when FSPDA=1. >>	FSWF=1; TSWF=R
	3429	**PM_STATUS.indication (Wire_fault=Not_detected)** & FSWF=1 << Occurs only when FSPDA=1. >>	FSWF=0

Table 9.2-4—Station Error Handling Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3431	**PS_STATUS.indication(Frequency_error)** & CSFE<FF & FSJC=1 & FSER=1 & MS=SOPT << 4 Mbit/s and 16 Mbit/s event only. >>	CSFE=(CSFE+1)
	3430	**PS_STATUS.indication(Frequency_error)** & FSJC=1 & FSER=0 & MS=SOPT << 4 Mbit/s and 16 Mbit/s event only. >>	FSER=1; TSER=R; CSFE=(CSFE+1)
	3432	**TSER=E** & ERR_SCNTR<>0 & FSJC=1 & FIPTXIS=0 << DTR Station is reporting errors. >>	**If** FSECO=0 then FSER=0; QUE_RPRT_ERR_PDU; SET ERR_SCNTR=0
	3433	**TSER=E** & ERR_SCNTR<>0 & FSJC=1 & FIPTXIS=1 << DTR C-Port is reporting errors. >>	**If** FSECO=0 then FSER=0; MRI_UNITDATA.indication (RPRT_ERR); [QUE_RPRT_ERR_PDU (optional-*x*)]; SET ERR_SCNTR=0
	3425	**TSER=E** & FSJC=1 & FSECO=1	TSER=R
	3423	**TSSL=E** & FSSLD=1 << Occurs only when FSPDA=1. >>	FSSL=1
	3424	**TSWFD=E** & FSJC=1 & FSWFA=0 & MS=SOPT << Occurs only when FSPDA=1. >>	FSWFA=1

9.2.5.5 Station Interface Signals—Station Operation Table

Table 9.2-5—Station Interface Signals Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3513	**DTU_UNITDATA-STATUS.request(Fail)** & FPTX_LTH=1 & FIPTXIS=1 & TS=STXD << Transmit FSM is currently transmitting a previously queued frame. This is an indication that frame Cut-through is terminating with an error. >>	DISCARD_PDU << The PDU discarded is the frame that was the subject of the previous DTU_UNITDATA.request. >>
	3516	**DTU_UNITDATA-STATUS.request(Fail)** & TS=STXN << Transmit FSM is currently in the normal state. This may occur between frame transmissions. >>	DISCARD_PDU << The PDU discarded is the frame that was the subject of the previous DTU_UNITDATA.request. >>
	3512	**DTU_UNITDATA-STATUS.request(OK) &** FPTX_LTH=0 & FIPTXIS=1 & TS=STXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a C-Port Cut-through frame is being transmitted. >>	FPTX_LTH=1 << The Cut-through frame has completed with an OK status, the frame length is now known. >>
	3530	**DTU_UNITDATA.request** & FSJC=1 & FSOP=1 & FR_LTH<=SPV(MAX_TX) & FIPTXIS=1 << C-Port in Station Emulation Mode. >> << A frame of known length is passed to the C-Port. >>	QUE_PDU
	3531	**DTU_UNITDATA.request** & FSJC=1 & FSOP=1 & FR_LTH=UNK & FIPTXIS=1 << C-Port in Station Emulation Mode. >> << A frame Cut-through operation has started and its frame length is currently not known. The data is optionally placed into the transmit queue and made available for transmission. >>	[QUE_PDU (optional-unk)] << QUE_PDU action allows the PDU_QUEUED event to occur. >>
	3532	**FR** & FPFCO=0 & FSJC=1 & FSOP=1 & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	DTU_UNITDATA.indication; DTU_UNITDATA-STATUS.indication (OK)
	3509	**FR** & FPFCO=1 & FSOP=1 & FSJC=1 & FIPTXIS=1 << Indicates that frame Cut-through has successfully completed. >>	DTU_UNITDATA-STATUS.indication (OK)
	3501	**FR** & FSJC=1 & FSOP=1 & FIPTXIS=0 << DTR Station has received a frame. >>	M_UNITDATA.indication

Table 9.2-5—Station Interface Signals Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3539	**FR_FC** & FPFCO=1 & FSJC=1 & FSOP=1 & FIPTXIS=1 << C-Port in Station Emulation Mode has received a frame. >>	DTU_UNITDATA.indication
	3502	**FR_LLC(DA=any_recognized_address)** & FSJC=1 & FSOP=1 & FIPTXIS=0 << DTR Station. >>	MA_UNITDATA.indication
	3534	**FR_MAC(DA<>any_recognized_address & SC<>0)** & FSJC=1 & FSOP=1 & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	MRI_UNITDATA.indication
	3540	**FR_MAC(DA=any_recognized_address & DC=0 & VI=09)**	DISCARD_PDU
	3503	**FR_MAC(DA=any_recognized_address & DC<>0 & VI<>09)** & FSJC=1 & FSOP=1 & FIPTXIS=0 << DTR Station. >>	MGT_UNITDATA.indication
	3533	**FR_MAC(DC<>0 & DC<>3 & SC=0)** & FSJC=1 & FSOP=1 & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	MRI_UNITDATA.indication
	3510	**FR_WITH_ERR** & FPFCO=1 & FSOP=1 & FSJC=1 & FIPTXIS=1 << C-Port in Station Emulation Mode. >> << Indicates that frame Cut-through has failed due to a frame error. >>	DTU_UNITDATA-STATUS.indication (Fail)
	3504	**FSTI=0** & FIPTXIS=0 << DTR Station. >>	PS_CONTROL.request (Transmit_mode=No_fill)
	3537	**FSTI=0** & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	{PM_CONTROL.request (Transmit_mode=No_fill)} **or** {PS_CONTROL.request (Transmit_mode=No_fill)} **<< An implementation shall take one of these two actions. >>**
	3505	**FSTI=1** & FIPTXIS=0 << DTR Station. >>	PS_CONTROL.request (Transmit_mode=Fill)

Table 9.2-5—Station Interface Signals Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3538	**FSTI=1** & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	{PM_CONTROL.request (Transmit_mode=No_fill)} **or** {PS_CONTROL.request (Transmit_mode=No_fill)} **<< An implementation shall take one of these two actions. >>**
	3506	FSTXC=0 << 4 Mbit/s and 16 Mbit/s only >>	PS_CONTROL.request (Crystal_transmit=Not_asserted)
	3507	**FSTXC=1** << **Note:** 1) When operating at 4 Mbit/s and 16 Mbit/s, Crystal Transmit is controlled by the Join and Monitor Station Operation Tables, and may or may not be asserted. 2) When operating at the High Media Rate, Crystal Transmit shall always be asserted. >>	PS_CONTROL.request (Crystal_transmit=Asserted)
	3508	**M_UNITDATA.request** & FSJC=1 & FSOP=1 & FR_LTH<=SPV(MAX_TX)	QUE_PDU **If** (DA=any_recognized_address), then MA_UNITDATA.indication(PDU) << Support the Loop Back function in the DTR Station if necessary. >>
	3511	**MA_UNITDATA.request** & FSJC=1 & FSOP=1 & FR_LTH<=SPV(MAX_TX)	QUE_PDU **If** (DA=any_recognized_address), then MA_UNITDATA.indication(PDU) << Support the Loop Back function in the DTR Station if necessary. >>
	3514	**MGT_UNITDATA.request**(SC<>0) & FSOP=1 & FR_LTH<=SPV(MAX_TX)	QUE_PDU
	3515	**MGT_UNITDATA.request(SC=0)**	DISCARD_PDU
	3535	**MRI_UNITDATA.request(SC<>0)** & FSJC=1 & FSOP=1 & FR_LTH<=SPV(MAX_TX) & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	QUE_PDU
	3536	**MRI_UNITDATA.request(SC<>0)** & FSJC=1 & FSOP=1 & FR_LTH=UNK & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	[QUE_PDU (optional-unk)]

9.2.5.6 Station Miscellaneous Frame Handling—Station Operation Table

Table 9.2-6—Station Miscellaneous Frame Handling Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1)

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3600	**FR_CHG_PARM**	SET APPR_PARMS
	3601	**FR_CHG_PARM(CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=0001)
	3602	**FR_CHG_PARM(CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=0001)
	3603	**FR_INIT**	SET APPR_PARMS
	3604	**FR_INIT(CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RPS; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=0001)
	3605	**FR_INIT(CORR_PRESENT)**	TXI_RSP_PDU(DC=RPS; SC=RS; CORR=RCV_CORR; RSP_TYPE=0001)
	3608	**FR_MAC_INV (ERR_COND=SC_INVALID & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8004)
	3609	**FR_MAC_INV (ERR_COND=SC_INVALID & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8004)
	3610	**FR_MAC_INV (ERR_COND=SHORT_MAC & SC_NOT_PRESENT)**	[TXI_RSP_PDU(DC<>RS; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8001) (optional-x)]
	3630	**FR_MAC_INV (ERR_COND=SHORT_MAC & SC_PRESENT & SC<>RS)**	TXI_RSP_PDU (DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8001)
	3612	**FR_MAC_INV (ERR_COND=SV_LTH_ERR & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8005)
	3613	**FR_MAC_INV (ERR_COND=SV_LTH_ERR & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8005)
	3614	**FR_MAC_INV (ERR_COND=SV_MISSING & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8007)
	3615	**FR_MAC_INV (ERR_COND=SV_MISSING & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8007)
	3618	**FR_MAC_INV (ERR_COND=VI_LTH_ERR & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8002)

Table 9.2-6—Station Miscellaneous Frame Handling Station Operation Table for the DTR Station using the TXI Access Protocol (FIPTXIS=0) or the C-Port in Station Emulation Mode using the TXI Access Protocol (FIPTXIS=1) *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3619	**FR_MAC_INV (ERR_COND=VI_LTH_ERR & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8002)
	3606	**FR_MAC_INV(ERR_COND=LONG_MAC & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8009)
	3607	**FR_MAC_INV(ERR_COND=LONG_MAC & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8009)
	3616	**FR_MAC_INV(ERR_COND=SV_UNK & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8008)
	3617	**FR_MAC_INV(ERR_COND=SV_UNK & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8008)
	3620	**FR_MAC_INV(ERR_COND=VI_UNK & SC<>RS & CORR_NOT_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8003)
	3621	**FR_MAC_INV(ERR_COND=VI_UNK & SC<>RS & CORR_PRESENT)**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8003)
	3622	**FR_REMOVE(DA=broadcast)**	[TXI_RSP_PDU(DC=RCV_SC; SC=RS; RSP_TYPE=800A) (optional-x)]
	3623	**FR_REMOVE(DA=Non_broadcast)** & FSRRO=1	TXI_RSP_PDU(DC=RCV_SC; SC=RS; RSP_TYPE=800A)
	3624	**FR_RQ_ADDR** & FIPTXIS=0 << DTR Station. >>	TXI_RPRT_ADDR_PDU
	3627	**FR_RQ_ADDR** & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	[TXI_RPRT_ADDR_PDU (optional-x)]
	3625	**FR_RQ_ATTACH** & FIPTXIS=0 << DTR Station. >>	TXI_RPRT_ATTACH_PDU
	3628	**FR_RQ_ATTACH** & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	[TXI_RPRT_ATTACH_PDU (optional-x)]
	3626	**FR_RQ_STATE** & FIPTXIS=0 << DTR Station. >>	TXI_RPRT_STATE_PDU
	3629	**FR_RQ_STATE** & FIPTXIS=1 << C-Port in Station Emulation Mode. >>	[TXI_RPRT_STATE_PDU (optional-x)]

9.2.5.7 LMT Transitions for FSLMTO=1

The following transitions are used to execute the Lobe Media Test when FSLMTO=1. This table is started (see reference 3801) when the LMT function is requested and the LMT function is inactive as the result of one of the following two conditions:

a) *Initial testing* of the lobe when the Join Machine enters the JS=SLT state from the JS=SREG state (see Table 9.2-1 transition 3121).
b) *Beacon testing* of the lobe when the Join Machine enters the JS=SLT state from the JS=SJC state (see 9.2.5.1 Table 9.2-1 transition 3114).

Table 9.2-7—Station Lobe Media Test Station Operation Table for the DTR Station when executing the Lobe Media Test and FSLMTO=1

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3806	**FR_TEST** & FSLTA=1 & CSLTF=0 << TEST MAC Frame received without errors and no more Frames to transmit. >>	FSLTA=0; FSLMTS=1; FA(TEST)=0 << Indicate LMT Testing Stage success to Table 9.2-1). >>
	3805	**FR_TEST** & FSLTA=1 & CSLTF>0 << TEST MAC Frame received without errors, test incomplete. >>	TSLMTP=R; CSLTF=(CSLTF-1); TXI_TEST_PDU << Continue the LMT Testing Stage. >>
	3804	**FR_LMTN** & FSLTA=1 & FSSLMT=1 << Lobe Media Test Notification MAC Frame received, exit Lobe Media Test Notification Stage. >>	FSSLMT=0; TSLMTP=R; CSLTF=n7; FSLTFE=0; FA(TEST)=1; TXI_TEST_PDU << Set Station's LMT functional address active and start the Lobe Media Test Testing Stage. >>
	3808	**FR_WITH_ERR** & FSLTA=1 & FSLTFE=0 & CSLTF=0 << Frame error detected, no other Frame errors present and no more Frames to transmit. >>	FSLTA=0; FSLMTS=1; FA(TEST)=0 << Indicate LMT Testing Stage success to Table 9.2-1. >>
	3810	**FR_WITH_ERR** & FSLTA=1 & FSSLMT=0 & CSLTF>0 & FSLTFE=0 << Frame error detected, no other Frame errors present and more Frames to transmit. >>	FSLTFE=1; CSLTF=(CSLTF-1); TSLMTP=R; TXI_TEST_PDU << Indicate first failure and continue LMT Testing Stage. >>
	3812	FR_WITH_ERR & FSLTA=1 & FSSLMT=0 & FSLTFE=1 << TEST Frame error detected and another Frame error has occurred. >>	FA(TEST)=0; FSLTA=0; FSLMTF=1 << Indicate LMT Testing Stage failure to Table 9.2-1. >>
	3801	**FSRLMT=1** & FSLTA=0 << Table 9.2-7 Starting Point: Join Station Operation Table 9.2-1 has requested execution of the Lobe Media Test (FSLMTO=1 only). >>	FSRLMT=FSLMTS=FSLMTF=0; FSLTA=FSSLMT=1; TSLMTR=R; TSLMTNP=R; TXI_LMTN_PDU << Start the Lobe Media Test Notification Stage defined in 9.1.6.2 by transmitting the Lobe Media Test Notification MAC Frame. >>

Table 9.2-7—Station Lobe Media Test Station Operation Table for the DTR Station when executing the Lobe Media Test and FSLMTO=1 *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	3807	**TSLMTP=E** & FSLTA=1 & FSSLMT=0 & CSLTF=0 & FSLTFE=0 << TEST MAC Frame loss detected, no other Frame errors present and no more Frames to transmit. >>	FSLTA=0; FSLMTS=1; FA(TEST)=0 << Indicate LMT Testing Stage success to Table 9.2-1. >>
	3809	**TSLMTP=E** & FSLTA=1 & FSSLMT=0 & FSLTFE=0 & CSLTF>0 << TEST MAC Frame loss detected, no other Frame errors present and more Frames to transmit. >>	FSLTFE=1; CSLTF=(CSLTF-1); TSLMTP=R; TXI_TEST_PDU << Indicate first failure and continue the LMT Testing Stage. >>
	3811	**TSLMTP=E** & FSLTA=1 & FSSLMT=0 & FSLTFE=1 << TEST Frame loss detected and another Frame error has occurred. >>	FA(TEST)=0; FSLTA=0; FSLMTF=1 << Indicate LMT Testing Stage failure to Table 9.2-1. >>
	3802	**TSLMTNP=E** & FSLTA=1 & FSSLMT=1 << Lobe Media Test Notification MAC Frame Pacing timer expired and TSLMTP has not yet expired. >>	TSLMTNP=R; TXI_LMTN_PDU << Continue LMT Notification Stage and retransmit the Lobe Media Test Notification MAC Frame. >>
	3803	**TSLMTR=E** & FSLTA=1 & FSSLMT=1 << Lobe Media Test Notification Frame not received before TSLMTR expired. >>	FSLTA=0; FSLMTF=1 << Indicate LMT Notification Stage failure to Table 9.2-1. >>

9.2.5.8 Precise Specification of Terms

This subclause provides precise specification of terms used in the "Event / Event & Conditions" and the "Actions / Outputs" columns of the Station Operation Tables.

9.2.5.8.1 Precise Specification of "Event / Events & Conditions"

Unless otherwise specified, the following terms and operations are defined:	
Expression	**Meaning of expression**
{flag}=0	The specified flag is set to zero (false).
{flag}=1	The specified flag is set to one (true).
{term1} < {term2}	Term 1 is less than term 2.
{term1} <= {term2}	Term 1 is less than or equal to term 2.
{term1} <> {term2}	Term 1 is not equal to term 2.
{term1} = {term2}	Term 1 is equal to term 2.
{term1} > {term2}	Term 1 is greater than term 2.
{term1} >= {term2}	Term 1 is greater than or equal to term 2.
{timer}=E	The specified timer has expired.

The following additional items of relevance are used in the tables:

— **&** means: "and."

The following definitions apply to all media rates unless specifically limited to a particular media rate or rates:

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
AND(x,y)	Bit-wise Logical AND function of binary objects x and y.
AP_RSP=value	The AP_RSP subvector, in the Registration Response MAC frame received, is equal to the hexadecimal value indicated.
Burst5_error_event << Occurs only at 4 Mbit/s and 16 Mbit/s >>	A PM_STATUS.indication(Burst5_error) has occurred. The conditions under which a Burst5_error is excluded are not uniquely specified by this standard (see Counter Burst Error in 3.6). At a minimum, the Station shall include the first Burst5_error following a valid MAC frame copied by the Station if the Burst5_error occurs within a frame. The Station may include every Burst5_error.
Connect.SMAC	The SMAC receives the command from management to start the process to join the network.
CORR_NOT_PRESENT	The received frame did not contain a correlator subvector.

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
CORR_PRESENT	The received frame did contain a correlator subvector.
DA<>any_recognized_address	The DA of the received frame does not match any of the Station's addresses, being a) any of the Station's individual addresses, or b) any of the Station's group addresses, or c) any of the Station's functional addresses, or d) any of the broadcast addresses defined in 3.2.4.1.
DA=any_recognized_address	The DA of the received frame matches any of the Station's addresses being a) one of the Station's individual addresses, or b) one of the Station's group addresses, or c) one of the Station's functional addresses, or d) one of the broadcast addresses defined in 3.2.4.1.
DA=MA	The DA of the received frame is equal to the individual address of the Station. If the Station's individual address is a Universally administered address, then all 48 bits must match. If the Station's individual address is a locally administrated address, then either a hierarchical address match or a 48-bit address match is allowed.
DA=Non_broadcast	The received frame was not sent to a broadcast address, but otherwise addressed to the Station.
DC<>0 & DC<>3	The destination class is not a Ring Station or a C-Port.
Disconnect.SMAC	The request from local management to remove the Station from the ring.
DTR_RSP=value	The DTR Response subvector, contained in the Insert Response MAC Frame, has the indicated hexadecimal value.
DTU_UNITDATA-STATUS.request(Status_Code)	Frame status is reported by the DTU to the PMAC. Status_Code may be one of the following: 1) OK: The frame has been successfully transferred to the PMAC without error. 2) Fail: Transfer of the frame to the PMAC has failed due to a frame error.
DTU_UNITDATA.request	The DTU requests a frame be transmitted.
EOB	End of Byte: This event occurs each time the last bit of an octet has been transmitted in the Transmit Data state (TS=STXD).
EOD	End of Data: This event occurs when the last octet of the Information Field has been transmitted in the Transmit Data state (TS=STXD).
ERR_COND=LONG_MAC	MAC frame too long – INFO field larger than maximum allowed VI value. See 10.3.6.5.
ERR_COND=SC_INVALID	Invalid Source Class. See 10.3.6.5.
ERR_COND=SHORT_MAC	MAC frame is not long enough to contain VL, VC, and VI fields. See 10.3.6.5.
ERR_COND=SV_LTH_ERR	Subvector length error. See 10.3.6.5.
ERR_COND=SV_MISSING	Missing Required Subvector. See 10.3.6.5.
ERR_COND=SV_SVV_ERR	A subvector contains an invalid subvector value. See 10.3.6.5.
ERR_COND=SV_UNK	Unknown subvector SVI value. See 10.3.6.5.

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
ERR_COND=VI_LTH_ERR	Vector length error. VL is not equal to the sum of all the SVLs plus the length of VL, VC, and VI fields, or VL does not agree with the length of the frame. See 10.3.6.5.
ERR_COND=VI_UNK	Unrecognized Vector ID value. See 10.3.6.5.
ERR_SCNTR<>0	Any Station error counter is not equal to zero.
FR	A frame has been received and meets the frame receive criteria specified in 4.3.2 (4 Mbit/s and 16 Mbit/s operation only) or 9.1.1.6 (High Media Rate operation only).
FR_AC	A bit sequence which indicates • a frame's SD and AC fields at 4 Mbit/s and 16 Mbit/s have been received as specified in 4.3.2, or • a frame's SSD and AC fields at the High Media Rate have been received as specified in 9.1.1.6.
FR_AMP	A verified Active Monitor Present MAC frame (see 10.3.3.3) is received.
FR_BN(criteria)	A verified Beacon MAC Frame (see 10.3.6) is received meeting the specified criteria.
FR_CHG_PARM(criteria)	A verified Change Parameters MAC frame (see 10.3.6) is received meeting the specified criteria.
FR_COPIED(criteria)	The SMAC successfully copied the received frame meeting the specified criteria.
FR_CT	A verified Claim Token MAC frame (see 10.3.6) is received.
FR_FC	A bit sequence which indicates a frame's SD, AC and FC fields have been received as specified in 9.1.1.6.
FR_INIT	A verified Initialize Station MAC frame (see 10.3.6) is received.
FR_INIT(criteria)	A verified Initialize Station MAC frame (see 10.3.6) meeting the specified criteria is received.
FR_INS_RSP(criteria)	A verified Insert Response MAC frame is received meeting the specified criteria.
FR_LLC(criteria)	A valid LLC frame meeting the specified criteria is received.
FR_LMTN	A verified Lobe Media Test Notification MAC frame (see 14.1.2) is received.
FR_LTH	The length of the frame to be transmitted. The value for the frame length includes all of the frame format fields beginning with the starting delimiter (SD) and including the interframe gap (IFG).
FR_LTH<=SPV(MAX_TX)	The frame length to be transmitted is less than or equal to the maximum allowed frame length by the Station's selected media rate.
FR_LTH=UNK	The frame length to be transmitted is unknown.
FR_MAC(criteria)	A valid MAC frame meeting the specified criteria is received.
FR_MAC_INV(reason)	A valid MAC frame is received which fails verification (see 10.3.6) for the reason specified.
FR_NOT_COPIED	The Station detects a frame addressed to one of its recognized addresses, but does not copy the frame.

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
FR_PHB(criteria)	A verified C-Port Heart Beat MAC frame (see 10.3.2.3) meeting the specified criteria is received.
FR_REG_RSP(criteria)	A verified Registration Response MAC frame (see 10.3.2.13) meeting the specified criteria is received.
FR_REMOVE(criteria)	A verified Remove MAC frame (see 10.3.6) meeting the specified criteria is received.
FR_RMV_ALRT << High Media Rate only >>	A verified Remove Alert MAC frame (see 14.3.1.3) is received.
FR_RP	A verified Ring Purge MAC frame (10.3.6) is received.
FR_RQ_ADDR	A verified Request Address MAC frame (10.3.6) is received.
FR_RQ_ATTACH	A verified Request Attachment MAC frame (10.3.6) is received.
FR_RQ_STATE	A verified Request Station State MAC frame (10.3.6) is received.
FR_SHB	A verified Station Heart Beat MAC frame (10.3.2.4) is received.
FR_SMP	A verified Standby Monitor Present MAC frame (10.3.3.4) is received.
FR_TEST	A verified Lobe Media Test MAC frame (14.3.1.1) is received.
FR_WITH_ERR	A frame is received with errors (see 4.3.2).
FR_WITH_ERR(criteria)	A frame is received with errors (see 4.3.2) meeting the specified criteria.
INTERNAL_ERR	Any internal error occurred that prevented the Station from following the established protocol (e.g., parity error, etc.).
INTERNAL_TEST_FAILURE	The Station failed during internal testing.
JS=state	The Join FSM is in the specified state.
M_UNITDATA.request	The Bridge interface requests a frame to be transmitted.
MA_UNITDATA.request	The LLC interface requests a frame to be transmitted.
MGT_UNITDATA.request	The Management interface requests a frame to be transmitted.
MRI_UNITDATA.request	The Management Routing interface requests a frame to be transmitted.
MS=state	The Monitor FSM is in the specified state.
PDU_QUEUED	A frame is queued for transmission.
PM_STATUS.indication (Signal_detection=signal_acquired) << Occurs only at 4 Mbit/s and 16 Mbit/s. >>	The PHY indicates valid receiver signal (see 5.1.4.1).
PM_STATUS.indication (Signal_detection=signal_loss) << Occurs only at 4 Mbit/s and 16 Mbit/s. >>	The PHY indicates loss of valid receiver signal (see 5.1.4.1).

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
PM_STATUS.indication (Wire_fault=Detected) << Occurs only when FSPDA=1. >>	The PHY indicates the presence of a Wire Fault (see 5.1.4.1).
PM_STATUS.indication (Wire_fault=Not_detected) << Occurs only when FSPDA=1. >>	The PHY indicates the absence of a Wire Fault (see 5.1.4.1).
PORT_ERR(criteria)	Any internal condition that prevents the successful completion of the PDU transmit operation. The criterion is either correctable (C-Port counts error) or not-correctable (C-Port closes).
PS_STATUS.indication (Frequency_error) << Occurs only at 4 Mbit/s and 16 Mbit/s. >>	The PHY indicates the frequency of the received data is out of tolerance (see 5.1.2.3).
PS_STATUS.indication (Link_status=Asserted) << Occurs only at the High Media Rate. >>	The High Media Rate PHY indicates that the link is active (see 9.8.1.1.3 for 100 Mbit/s and 9.8.2.1.3 for 1000 Mbit/s).
PS_STATUS.indication (Link_status=Not_asserted) << Occurs only at the High Media Rate. >>	The High Media Rate PHY indicates that the link is inactive (see 9.8.1.1.3 for 100 Mbit/s and 9.8.2.1.3 for 1000 Mbit/s).
SA<>MA	The Source Address of a received frame is not equal to the individual address of the Station.
SA<>SUA	The Source Address of a received frame is not equal to the Station's Stored Upstream Address.
SA=MA	The Source Address of a received frame is equal to the individual address of the Station.
SA=SUA	The Source Address of a received frame is equal to the Stored Upstream Address.
SC_NOT_PRESENT	The MAC frame is too short to contain the source class.
SC_PRESENT	The MAC frame is long enough to contain the source class.
SC<>RS	The Source Class is not a Ring Station (<>0).
SC=0	The Source Class is a Ring Station.
SC=CRS	The Source Class is 4 (Configuration Report Server).
SC=RPS	The Source Class is 5 (Ring Parameter Server).
SPV(AP_MASK)=value	The value of SPV(AP_MASK) is equal to the hexadecimal value indicated (see 10.5.1.2).
SPV(MAX_TX)	SPV(MAX_TX) is defined in 10.5.1.2.
STATION_ERR	Any internal condition that prevents the successful completion of the PDU transmit operation.

Precise Specification of "Event / Event & Conditions"	
Event or Condition Term	**Meaning of this term**
SUA	The Stored Upstream Address value.
TEST_FAILURE	The Station failed its self-test.
TEST_OK	The Station passed its self-test.
TS=state	The Transmit FSM is in the specified state.
TXI_REQ	The SMAC requests a frame be transmitted.

9.2.5.8.2 Precise Specification of "Actions / Outputs"

Unless otherwise specified, the following terms and operations are defined:	
Expression	**Meaning of expression**
{counter}=({counter}+1)	Increment the specified counter by one.
{counter}=({counter}-1)	Decrement the specified counter by one.
{counter}=value	Set the specified counter to the specified value.
{flag}=0	Set the value of the specified flag to zero (false).
{flag}=1	Set the value of the specified flag to one (true).
{timer}=R	The specified timer is set to its initial value and started.
Variable=value	Set the variable to the specified value.

The following additional items of relevance are used in the tables.

— * ; means: "and."

The following definitions apply to all media rates unless specifically limited to a particular media rate or rates:

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
AP_REQ=value	The AP_REQ subvector, in the REG_REQ MAC frame being transmitted, is set to the hexadecimal value indicated.
BN_TYPE=value	The value of the beacon type subvector to be transmitted.
CORR=RCV_CORR	The value of the correlator subvector will be the same value as the received correlator subvector.

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
CORR=UNK_VALUE (optional-x)	The frame received did not contain a correlator subvector (see 3.3.4), thus the value of the correlator subvector to be transmitted is unspecified and the subvector may be omitted. The standard recommends new implementations not to transmit the correlator subvector, when no correlator subvector was received.
CSBTX=value	The counter CSBTX is set to the hexadecimal value indicated.
DC<>RS	The destination class field DC shall not be 0. Note that the source class field (SC) of the received frame was not present and thus the destination class of the response frame is not defined but shall not be the ring Station class.
DC=CRS	The value of the Destination Class is 4 (Configuration Report Server).
DC=RCV_SC	The destination class field DC shall contain the value of the source class field (SC) of the received frame.
DISCARD_PDU	Discard the PDU.
DTU_UNITDATA-STATUS.indication (Status_Code)	Frame status is indicated by the PMAC to the DTU. Status_Code may be one of the following: 1) OK: The frame has been successfully transferred to the DTU without error. 2) Fail: Transfer of the frame to the DTU has failed due to a frame error.
DTU_UNITDATA.indication	The frame is indicated to the DTU.
Flush_transmit_queues	The transmitter is instructed to discard any frames in its transmit queues.
FR_LTH<=PPV(MAX_TX)	The length of the frame to be transmitted is less than or equal to the C-Port's maximum allowed frame length.
FSRLMT=1	The Station requests the Lobe Media Test function defined in 9.1.6.2 and specified by Table 9.2-7.
FTI=x	The value of FTI is not specified.
IAC=SPV(IAC)	The Station indicates the number of Individual addresses supported as defined in SPV(IAC) in the REG_REQ MAC frame.
INSERT << Occurs only when FSPDA=1. >>	Request the PHY to physically connect the Station to the network. (PM_CONTROL.request(Insert_station) in 9.7.1.2.2 for 4 Mbit/s or 16 Mbit/s, and 9.8.1.1.7 for 100 Mbit/s. Not used at 1000 Mbit/s).
INT_TEST	The station starts its internal tests.
JS=state	The Join FSM transitions to the specified state.
M_UNITDATA.indication	The frame is indicated to the bridge interface.
MA_UNITDATA.indication	The frame is indicated to the LLC interface.
MGT_UNITDATA.indication	The frame is indicated to the management interface.
MS=state	The Monitor FSM transitions to the specified state.
P	The value of the P-bits in the AC field.
PD=SPV(PD)	The PD subvector, in REG_REQ MAC frame being transmitted, is set to the value of SPV(PD).

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
Pm	The priority of the PDU being queued.
PM_CONTROL.request (Transmit_mode=Fill)	The C-Port PMAC requests the PMC to stop repeat and start sourcing fill. (See 9.7.2.2 for 4 Mbit/s and 16 Mbit/s. Not used at 100 Mbit/s or 1000 Mbit/s.)
PM_CONTROL.request (Transmit_mode=No_fill)	The C-Port PMAC requests the PMC to stop sourcing fill and start repeat. (See 9.7.2.2 for 4 Mbit/s and 16 Mbit/s. Not used at 100 Mbit/s or 1000 Mbit/s.)
PS_CONTROL.request (Crystal_transmit=Asserted)	The Station SMAC or C-Port PMAC requests Crystal_transmit (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s operation, 9.8.1.1.4 for 100 Mbit/s, or 9.8.2.1.4 for 1000 Mbit/s operation.).
PS_CONTROL.request (Initialize, Media_rate=2)	The Station SMAC requests the PSC to initialize the PHY for operation at 100 Mbit/s.
PS_CONTROL.request (Transmit_mode=Fill)	The C-Port PMAC requests the PSC stop repeat and start sourcing fill (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s or 9.8.2.1.4 for 1000 Mbit/s).
PS_CONTROL.request (Transmit_mode=No_fill)	The C-Port PMAC requests the PMC to stop sourcing fill and start repeat (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s or 9.8.2.1.4 for 1000 Mbit/s).
PS_CONTROL.request (Crystal_transmit=Not_asserted) << Used only by 4 Mbit/s and 16 Mbit/s. >>	The Station SMAC removes the Crystal_transmit request (see 5.1.2.4).
QUE_PDU	Queue the PDU for transmission.
Remove_station << Not used at 1000 Mbit/s. >>	Request the PHY to physically disconnect the Station from the link (PM_CONTROL.request(Remove_station) in 9.7.1.2.2 for 4 Mbit/s or 16 Mbit/s, and 9.8.1.1.7 for 100 Mbit/s).
RSP_TYPE=value	The Response Code subvector shall have the hexadecimal value specified.
SC=RS	The Source Class field (SC) shall contain the value zero (Ring Station).
SET APPR_PARMS	The Station shall set the Station's parameters to the values indicated in the received frame.
SET ERR_SCNTR=0	Set the values for all of the error counters reported in the Report Error MAC frame to zero.
Set_initial_conditions << 4 Mbit/s and 16 Mbit/s only >>	The Station SMAC shall set all flags to zero, set all counters to zero, set all stored values to zero, and stop all timers. The Monitor and Transmit FSM states are not specified. The PS_CONTROL.request(Medium_rate) and PM_CONTROL.request(Medium_rate) shall indicate to the PHY the value of FSMRO (less than 2).
Set_initial_conditions << High Media Rate only >>	The Station SMAC shall set all flags to zero, set all counters to zero, set all stored values to zero and stop all timers. The Monitor FSM state is not specified. The PHY is assumed to be already initialized at the correct speed.

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
SUA=SA	Store the value of the source address (SA) from the received frame as the Stored Upstream Address (SUA).
TEST	Used by the 4.3 Station Operation Table. See 4.3.5.2 for definition.
TS=state	The Transmit FSM transitions to the specified state.
TX_AB	The Station shall transmit an Abort Sequence as follows: • **4 Mbit/s and 16 Mbit/s:** A Starting Delimiter immediately followed by an Ending Delimiter. • **100 Mbit/s:** A frame abort (PS_CONTROL.request(Abort_frame) as specified in 9.8.1.1.4). • **1000 Mbit/s:** A frame abort (PS_CONTROL.request(Abort_frame) as specified in 9.8.2.1.4).
TX_EFS << High Media Rate only >>	The Station shall transmit an end-of-frame sequence composed of ET, ESD, and IFG fields. The ET E-bit shall be zero.
TX_EFS(I=0) << 4 Mbit/s and 16 Mbit/s only >>	The Station shall transmit an end-of-frame sequence composed of ED, FS, and IFG fields. The E, I, A, and C bits shall be zero.
TX_EFS(E=1) << High Media Rate only >>	The C-Port shall transmit an end-of-frame sequence composed of ET, ESD, and IFG fields. The E-bit shall be one.
TX_EFS(I=0, E=1) << 4 Mbit/s and 16 Mbit/s only >>	The C-Port shall transmit an end-of-frame sequence composed of ED, FS, and IFG fields. The I, A, and C bits shall be zero. The E-bit shall be one.
TX_FCS	The Station shall transmit frame check sequence for the frame as defined in 3.2.7.
TX_SFS(P=value; R=value)	The Station shall transmit the start-of-frame sequence as follows: • **4 Mbit/s and 16 Mbit/s:** A Starting Delimiter followed by the AC field as defined below. • **100 Mbit/s:** A Start Frame (PS_UNITDATA.request(Start_stream_delimiter)—see 9.8.1.1.2) followed by the AC field as defined below. • **1000 Mbit/s:** A Start Frame (PS_UNITDATA.request(Start_stream_delimiter)—see 9.8.2.1.2) followed by the AC field as defined below. The AC field's P (priority) and R (reservation) values shall be as specified, and T=1 and M=0.

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
TXI_BN	The Station shall transmit a Beacon MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_INS_REQ	The Station shall transmit a Insert Request MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_INV_FCS	The C-Port shall transmit an invalid FCS.
TXI_LMTN_PDU(criteria) << High Media Rate only >>	The Station shall transmit a Lobe Media Test Notification MAC frame with the AC field values of P=0, T=1, M=0, R=000 and the criteria specified. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_REG_REQ(criteria)	The Station shall transmit a Registration Request MAC frame with the AC field values of P=*x*, T=1, M=0, R=000 and the criteria specified. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RMV_ALRT << High Media Rate only >>	The Station shall transmit a Remove Alert MAC frame with the AC field values of P=*x*, T=1, M=0, R=000 and the criteria specified. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RPRT_ADDR_PDU	The Station shall transmit a Report Station Addresses MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RPRT_ATTCH_PDU	The Station shall transmit a Report Station Attachment MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RPRT_ERR_PDU	The Station shall transmit a Report Error MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RPRT_STATE_PDU	The Station shall transmit a Report Station State MAC frame with the AC field values of P=*x*, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_RSP_PDU(criteria)	The Station shall transmit a Response MAC frame with the AC field values of P=*x*, T=1, M=0, R=000 and the criteria specified. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).

Precise Specification of "Actions /Outputs"	
Action or Output Term	**Meaning of this term**
TXI_SHB	The Station shall transmit a Station Heart Beat MAC frame with the AC field values of P=x, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).
TXI_TEST << This action is *only* executed when FSLMTO=0 >> << 4 Mbit/s and 16 Mbit/s only >>	The Station shall perform a test of its transmit functions, its receive functions, and the medium between the Station and the C-Port. This test shall complete prior to the expiration of TSLMTC. It is recommended that the data path include the elastic buffer and the fixed latency buffer (see 5.8). A Station shall fail the test if the sustained bit error rate does not meet the criteria defined in annex P.
TXI_TEST_PDU(criteria)	The Station shall transmit a Lobe Media Test MAC frame with the AC field values of P=0, T=1, M=0, R=000 and the criteria specified. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event (see 9.1.8).

Replace 9.3 with the following:

9.3 C-Port Join and TXI Access Protocol specification

This subclause defines the DTR operation of a C-Port when operating in Port mode. This subclause supports the TXI Access Protocol and includes the Join process of the TKP Access Protocol.

The following configurations (see Figure 9-1) are supported by this subclause:

— Configuration 1, entity A: The TXI Access Protocol for the C-Port when operating in Port mode is fully defined in this subclause.
— Configuration 2, entity C: The TXI Access Protocol for the C-Port when operating in Station Emulation mode is detected by this subclause and uses the Station Operation Tables defined in 9.2.
— Configuration 3, entity E: The TKP Access Protocol for the C-Port when operating in Port mode uses the Join Port Operation Table defined in this subclause and the Transmit, Monitor, Error Handling, Interface, and Miscellaneous Frame Handling Port Operation Tables defined in 9.4.
— Configuration 4, entity G: The TKP Access Protocol for the C-Port when operating in Station Emulation mode is detected by this subclause and uses the Port Operation Tables defined in 9.5.

Six tables called C-Port Operation Tables specify the C-Port's TXI Access Protocol. The C-Port Operation Tables are functionally divided into the Join, Transmit, and Monitor functions as well as their support functions.

The operation of the Join, Transmit, and Monitor functions is explained using high level FSM diagrams in 9.3.1.1 through 9.3.1.3.

The C-Port Operation Tables are presented as follows:

a) The C-Port Join Port Operation Table—Table 9.3-1.
b) The C-Port Transmit Port Operation Table for the TXI Access Protocol—Table 9.3-2.
c) The C-Port Monitor Port Operation Table for the TXI Access Protocol—Table 9.3-3.

d) The C-Port Error Handling Port Operation Table for the TXI Access Protocol—Table 9.3-4.

e) The C-Port Interface Signals Port Operation Table for the TXI Access Protocol—Table 9.3-5.

f) The C-Port Miscellaneous Frame Handling Port Operation Table for the TXI Access Protocol—Table 9.3-6.

Low-level FSM diagrams representing all state changes in the Join, Transmit, and Monitor Port Operation Tables are presented in Annex M.

9.3.1 FSM Overview

This subclause and its figures provide an overview of the C-Port TXI Access Protocol Join, Monitor, and Transmit FSMs. Functions performed by these FSMs are defined in the C-Port Operation Tables defined in 9.3.4. See 9.1.1.4 for discussion of the interaction between the Join, Transmit, and Monitor FSMs.

9.3.1.1 C-Port Join FSM Overview

The C-Port Join FSM overview diagram is shown in Figure 9.3-1. The Join FSM always begins in the Bypass state (JS=BP). C-Port policy flags, set prior to management issuing a Connect.PMAC command, determine the operational characteristics of the C-Port. The C-Port may operate in either Port mode or Station Emulation mode. Station Emulation mode operation is initiated in this subclause and defined in 9.2 and 9.5. Port mode operation is defined in this subclause. This Join FSM is used to support both the TKP and the TXI Access Protocols.

The C-Port participates in the Registration Process when the attached Station initiates registration. The Join process continues with Lobe Test (JS=PLT), where the C-Port supports the Station's actions by providing a repeat path. Once the Station signals that the lobe test has completed, the C-Port reports to the Station the results of the Duplicate Address Check (JS=PDAC). When the Duplicate Address Check is successful, the C-Port completes the Join process by entering Join Complete TXI (JS=PJCI).

When supporting either a Classic Station, or a DTR Station using the TKP Access Protocol, the C-Port supports the Station’s Lobe Media Test while still in Registration (JS=PREG). However, if the C-Port is configured by management to support only the TXI Access protocol (PPV(AP_MASK)=0002), then the C-Port shall not supply a repeat path while in the registration state (JS=PREG). The C-Port exits Registration when the Station’s Phantom Drive is detected and starts a Claim Token cycle to minimize the time it will take for a station to join. The Join FSM provides the Registration Query protocol (JS=PRQ) to permit a station to modify its operational mode from TKP to TXI. This Join FSM is used to complete the join process, while the Monitor and Transmit FSMs are defined in 9.4.

The precise definition of the C-Port Join FSM is found in Table 9.3-1.

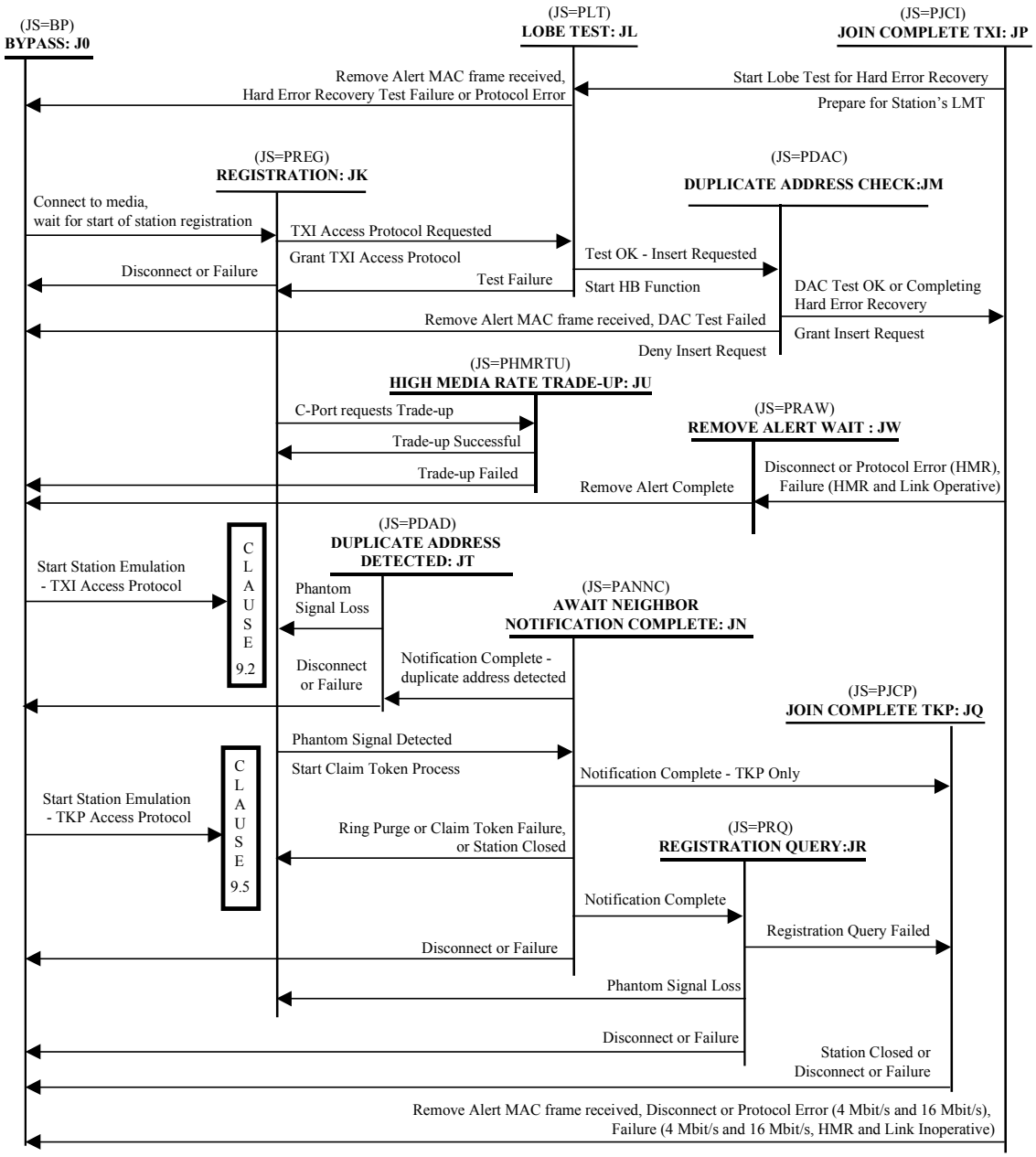
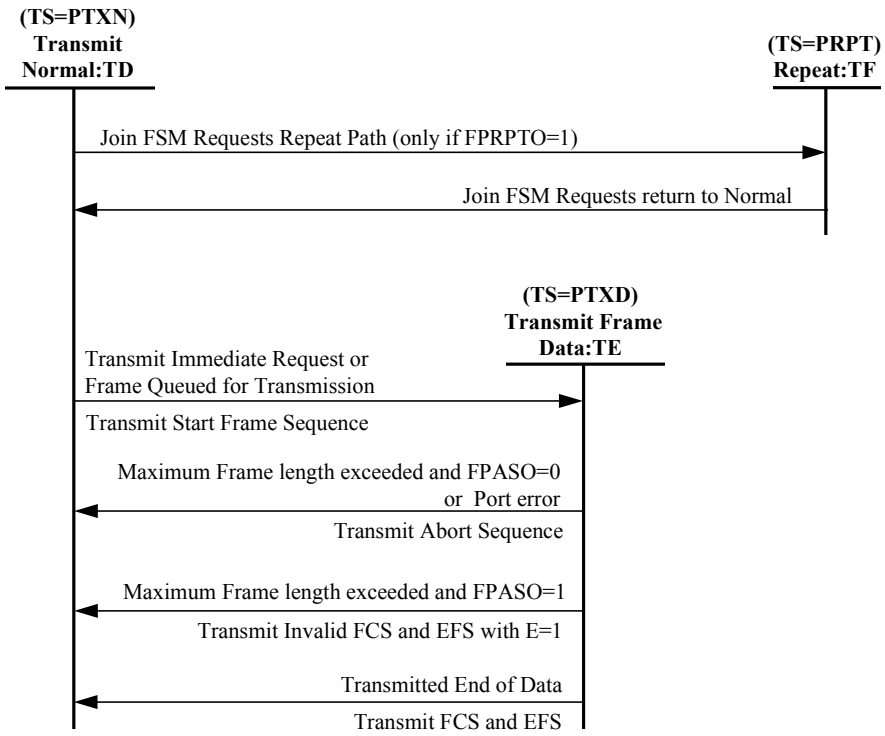


Figure 9.3-1—Overview C-Port Join FSM

9.3.1.2 C-Port Transmit FSM Overview

The C-Port Transmit FSM is shown in Figure 9.3-2. The transmit FSM is used to transmit frames as described in 9.1.8 and to supply a repeat path for use by the Station.

The precise definition of the Transmit FSM is found in Table 9.3-2.



Port Transmit (TS=State) Finite State Machine
TXI Access Protocol

Figure 9.3-2—Overview C-Port Transmit FSM

9.3.1.3 C-Port Monitor FSM Overview

The C-Port Monitor FSM is shown in Figure 9.3-3. The monitor FSM supports the Heart Beat, Hard Error Recovery, and Error Reporting functions as described in 9.1.9– 9.1.11 respectively.

The precise definition of the Monitor FSM is found in Table 9.3-3, Table 9.3-4, Table 9.3-5, and Table 9.3-6.

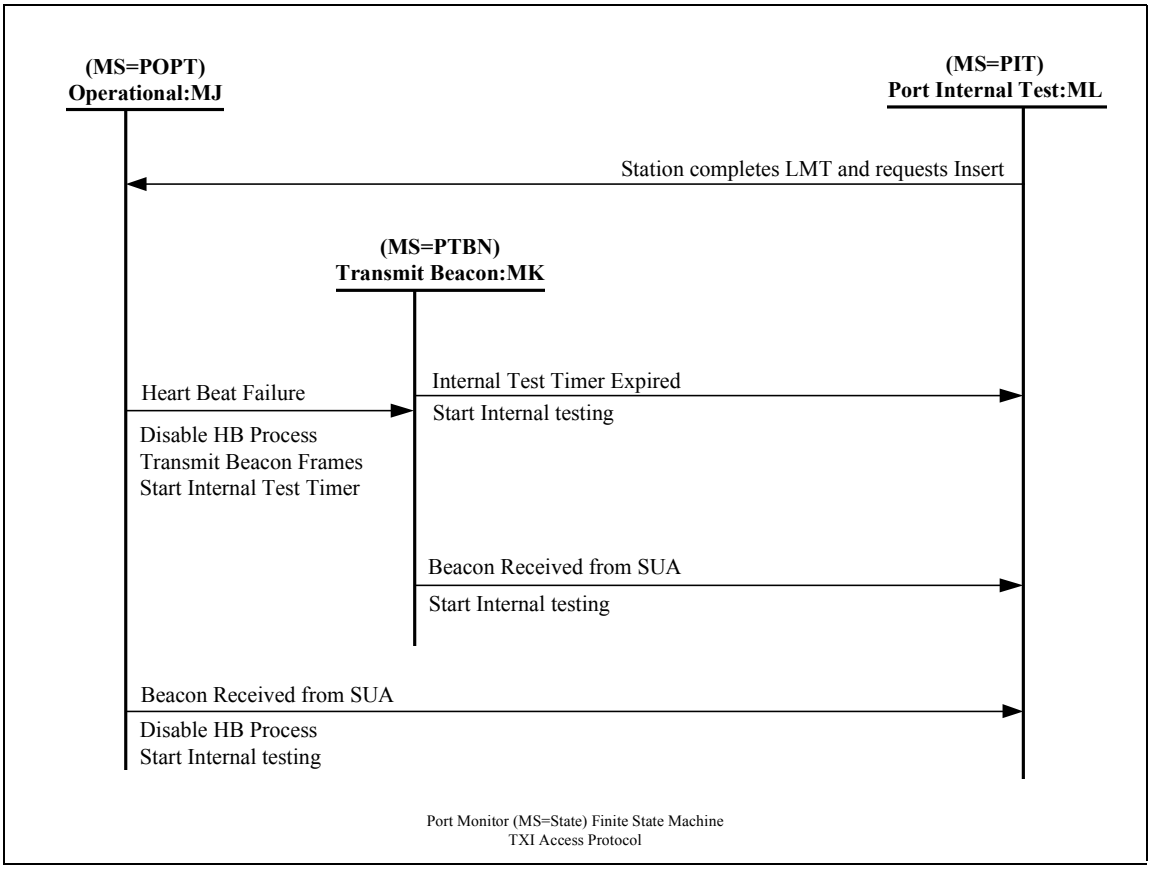


Figure 9.3-3—Overview C-Port Monitor FSM

9.3.2 Abbreviations and Notations

The following abbreviations and notations are used in the C-Port Operational Tables and State Machine Descriptions. Additional terms may be found in 4.2.3 and 4.2.4.

TXI C-Port Policy Flag Notations
FPACO = Flag, C-Port AC Repeat Path Option
FPASO = Flag, C-Port Abort Sequence Option
FPBHO = Flag, C-Port Beacon Handling Option
FPECO = Flag, C-Port Error Counting Option
FPFCO = Flag, C-Port Frame Control Option
FPMRO = Flag, C-Port Medium Rate Option
FPOTO = Flag, C-Port Operation Table Option
FPRPTO = Flag, C-Port Repeat Option

PMAC Policy Variable Notations
PPV(AP_MASK) = Access Protocol Mask
PPV(MAX_TX) = Maximum Octets Transmit
PPV(PD_MASK) = Phantom Subvector Value Mask

PMAC Interface Flag Notations
FIPTKPPE =Flag, Interface C-Port TKP Port Mode Error
FIPTKPP = Flag, Interface C-Port TKP Port Mode
FIPTKPS = Flag, Interface C-Port TKP Station Emulation
FIPTXIS = Flag, Interface C-Port TXI Station Emulation

PMAC Protocol Flag Notations
FPBNT = Flag, C-Port beacon test
FPBLT = Flag, C-Port break lobe test
FPBPF = Flag, C-Port bypass force
FPBPW = Flag, C-Port bypass wait
FPDLT = Flag, C-Port disrupt lobe test
FPDTUREQ = Flag, C-Port DTU request pending
FPEFS = Flag, C-Port ending frame sequence sent
FPER = Flag, C-Port error report
FPHBA = Flag, C-Port heart beat active
FPINSD = Flag, C-Port insert detected
FPINSLE = Flag, C-Port insert loss enabled
FPJC = Flag, C-Port join complete
FPMR = Flag, C-Port media rate
FPOP = Flag, C-Port operational
FPPLD = Flag, C-Port phantom loss detect
FPRPT = Flag, C-Port repeat path enabled
FPSL = Flag, C-Port signal loss
FPSLD = Flag, C-Port signal loss detected
FPTAS = Flag, C-Port Transmit Abort Sequence
FPTI = Flag, C-Port transmit idles
FPTXC = Flag, C-Port transmit from crystal
FPTX_LTH = Flag, C-Port transmit length

SMAC Protocol Flag Notations
FSMR = Flag, Station media rate

TXI Station Policy Flag Notations
FSMRO = Flag, Station media rate option

PMAC Error Counter Notations
CPABE = Counter, Abort Error
CPBE = Counter, Burst Error
CPFE = Counter, Frequency Error
CPIE = Counter, Internal Error
CPLE = Counter, Line Error
CPRCE = Counter, Receive Congestion Error

PMAC Counter Notations
CPBTX = Counter, C-Port bytes transmitted
CPRAT = Counter, C-Port remove alert transmit
CPRQ = Counter, C-Port registration query

PMAC Stored Value Notations
S_AP = Stored Access Protocol
SDAC_RC = Stored duplicate address check return code
SIAC = Stored individual address count
SPD = Stored phantom subvector value
SUA = Stored upstream address

PMAC Timer Notations
TPBLT = Timer, C-Port break lobe test
TPDLT = Timer, C-Port disrupt lobe test
TPER = Timer, C-Port error report
TPHMRW = Timer, C-Port high media rate wait
TPIRD = Timer, C-Port insert response delay
TPIT = Timer, C-Port internal test
TPLMTR = Timer, C-Port lobe media test running
TPPD = Timer, C-Port phantom detect
TPPLD = Timer, C-Port phantom loss detect
TPQHB = Timer, C-Port queue heart beat
TPQP = Timer, C-Port queue PDU
TPRAP = Timer, C-Port remove alert pace
TPRHB = Timer, C-Port received heart beat
TPRQD = Timer, C-Port registration query delay
TPSL = Timer, C-Port signal loss
TPTUAD= Timer, C-Port Trade-up Assured Delivery

PMAC Join State Notations
JS=BP = Bypass
JS=PANNC = C-Port Await Neighbor Notification Complete
JS=PDAC = C-Port Duplicate Address Check
JS=PDAD = C-Port Duplicate Address Detected
JS=PJCI = C-Port Join Complete TXI
JS=PJCP = C-Port Join Complete TKP
JS=PLT = C-Port Lobe Test
JS=PRAW = C-Port Remove Alert Wait
JS=PREG = C-Port Registration
JS=PRQ = C-Port Registration Query

PMAC Transmit State Notations	PMAC Monitor State Notations
TS=PRPT = C-Port Repeat	MS=POPT = C-Port Operational
TS=PTXD = C-Port Transmit Frame Data	MS=PIT = C-Port Internal Test
TS=PTXN = C-Port Transmit Normal	MS=PTBN = C-Port Transmit Beacon

9.3.3 State Machine Elements

The state machines use the following counters, flags, and states to describe the operation of the C-Port. These are logical elements used solely to describe the operation and do not specify an implementation. The value of the flags and counters are only meaningful internally to the state machine definition. Conformance will only be based on the C-Port's ability to perform the protocol as specified by the Table 9.3.1, Table 9.3-2, Table 9.3-3, Table 9.3-4, Table 9.3-5, and Table 9.3.6.

9.3.3.1 PMAC Counters

Unless otherwise specified, all counters are set to 0 by the "Set_initial_conditions" action as the result of the Join FSM transition detecting the Connect.PMAC request.

A counter may be set to a value, incremented, or decremented because of an action specified in the C-Port operation table.

The following C-Port counters are defined:

Counter, C-Port Bytes Transmitted (CPBTX)

The counter CPBTX is used by the Transmit FSM to limit the number of octets that can be transmitted. The CPBTX is compared against PPV(MAX_TX). When CPBTX exceeds PPV(MAX_TX), the Transmit FSM terminates the transmission of the frame and transmits an abort sequence. PPV(MAX_TX) is defined in 10.5.2.2 when operating at 4 Mbit/s and 16 Mbit/s and 14.5.2.2 when operating at the High Media Rate.

When PPV(MAX_TX) is assigned a value range, a single value within the range is used for the purpose of comparison. An implementation is not required to use the same value of PPV(MAX_TX) for each comparison.

Counter, C-Port Remove Alert Transmit (CPRAT)

The counter CPRAT is used at the High Media Rate to determine the number of Remove Alert MAC Frames yet to be transmitted. Its initial value is specified in 9.3.4 as "n9".

Counter, C-Port Registration Query (CPRQ)

The counter CPRQ is used by the Registration Query protocol to control the number of Registration Query MAC frames that are resent to the Station. The value is initially set to 4 on entry to the Registration Query State (JS=PRQ) and is decremented each time a Registration Query frame is sent.

9.3.3.2 PMAC Protocol Flags

The following C-Port flags, listed alphabetically, are defined.

Flag, C-Port Beacon Test (FPBNT)

The flag FPBNT is used by the Monitor FSM to signal the Join FSM to enter the Lobe Test (JS=PLT) state in order to perform a Lobe Media test as part of the Hard Error Recovery Process. The flag is set by the Moni-

tor FSM when loss of Phantom signal is detected by the C-Port. The flag is reset by the Join FSM when entering the Lobe Test state.

Flag, C-Port Break Lobe Test (FPBLT)

If the C-Port is configured by management to support the TXI AP only (AP_MASK=0002), this flag is set to 1 on the receipt of any frame and optionally any token. FPBLT set to 1 indicates that the Join FSM is preparing to disrupt the attached station's lobe test.

Flag, C-Port Bypass Force (FPBPF)

The flag FPBPF is set to 1 when a "PORT_ERR(not_correctable)" event is detected. The Join FSM upon detecting FPBPF=1 and the Transmit Normal state (TS=PTXN) forces the Join FSM to enter the Bypass state (JS=BP).

Flag, C-Port Bypass Wait (FPBPW)

The flag FPBPW is set to 1 by the Join FSM to delay exit to the Bypass state (JS=BP) until the transmission of an Insert Response MAC frame with a DTR_RSP subvector value of 8020 has completed. This prevents the C-Port from closing until the frame has transmitted.

Flag, C-Port Disrupt Lobe Test (FPDLT)

At the expiration of timer TPBLT, this flag is set to 1, timer TPDLT is started, and the repeat path is broken (FPRPT=0). FPDLT set to 1 indicates to the FSM that the attached station's lobe test is in the process of being disrupted.

Flag, C-Port DTU Request Pending (FPDTUREQ)

The flag FPDTUREQ is used by the Join FSM when making a request to the DTU for service (DTU_UNITDATA.indicate). It is used by the PMAC to pass address information during Join to the DTU and is part of the Duplicate Address Function that occurs during the Join process. The value of FPDTUREQ is initially 0. It is set to 1 when a DTU_DAC.request request is issued by the PMAC. The Join FSM sets it to 0 when a DTU_DAC.response is received by the PMAC.

Flag, C-Port Ending Frame Sequence Sent (FPEFS)

The flag FPEFS is used by the Transmit FSM to signal the Join FSM that it has transmitted an Ending Frame Sequence (EFS). The Join FSM sets up the signaling by setting FPEFS to 0, and queuing a frame for transmission. When the Transmit FSM has transmitted the frame (TX_EFS), it sets FPEFS to 1. The Join FSM detects the event FPEFS=1 and executes the appropriate actions.

Flag, C-Port Error Report (FPER)

The flag FPER is set to 1 when the first reportable error is detected and indicates that subsequent errors should not reset the error timer TPER. The flag FPER is set to 0 when the error timer expires. When TPER expires, the C-Port issues a MRI_UNITDATA.indication containing a Report Error PDU.

Flag, C-Port Heart Beat Active (FPHBA)

The flag FPHBA is used to control the Heart Beat Process defined in 9.1.8. This flag is initially set to 0 and is set to 1 when the Join FSM enters the Duplicate Address Check (JS=PDAC) state. When this flag is set to 1, the Heart Beat process timers are started (TPQHB and TPRHB) and loss of Heart Beat can be detected. The

flag is set to 0 when the Beacon Process is started by the Monitor FSM due to either loss of Heart Beat, or receipt of a Beacon frame (SA=SUA).

Flag, C-Port Insert Detected (FPINSD)

The flag FPINSD indicates the detection or the lack thereof, of an insertion request from the phantom-signaling channel. FPINSD is set to 1 upon receiving PM_STATUS.indication(Insert=Detected). FPINSD is set to 0 upon receiving PM_STATUS.indication(Insert=Not_detected).

Flag, C-Port Insert Loss Enabled (FPINSLE)

The flag FPINSLE is used by the PMAC in conjunction with FPINSD to determine that phantom signaling has changed from Insert=Detected to Insert=Not_detected once the C-Port is in Join Complete (JS=PJCI). The flag is set to 1 when the event PM_STATUS.indication(Insert=Detected) occurs. The flag is set to 0 on the transition from JS=PDAC to JS=PJCI.

Flag, C-Port Join Complete (FPJC)

The flag FPJC is set to 1 upon successful completion of the Duplicate Address Check state (JS=PDAC) and entry into the Join Complete TXI state (JS=PJCI). This flag is used by the Join FSM to determine when the transition to Join Complete TXI (JS=PJCI) requires a completed Duplicate Address Test; the difference between an initial joining of the Station and the recovery process.

Flag, C-Port Media Rate (FPMR)

The flag FPMR is used to control the operation of the Port Operation Tables as it relates to the operational speed of the media. It has the same definitions as the FPMRO flag defined in 14.5.2.1.4, except it is set as needed by the C-Port Operation Tables.

Flag, C-Port Operational (FPOP)

The flag FPOP is set to 1 when the C-Port enters the Join Complete TXI state (JS=PJCI). When FPOP is 0, the C-Port will not forward LLC and Management frames, and the Transmit FSM is unable to transmit queued frames (PDU_QUEUED). When FPOP is 1, the C-Port will forward LLC frames to the DTU, Management frames to the Management Routing Interface (MRI), and the Transmit FSM can transmit queued frames.

Flag, C-Port Phantom Detect (FPPD)

The C-Port uses this flag to determine whether phantom has been detected before timer TPPD expires(Phantom has not been detected if the timer TPPD expires when FPPD=1. The flag FPPD is set to 1 when the C-Port enters the Join Complete state (JS=PJCI). The flag FPPD is set to 0 when phantom is detected.

Flag, C-Port Protocol Loss Detect (FPPLD)

The C-Port uses this flag to determine whether the Station is in the correct state prior to starting Beacon Lobe Test. It is required to prevent a Port lock-up in the event of a Station fault during Hard Error Recovery. The Station is not in the correct state if the timer TPPLD expires when FPPLD=1. The flag FPPLD is set to 1 when the C-Port enters the Internal Test state (MS=PIT). The flag FPPLD is set to 0 when phantom loss is detected (FPINSLE=1) or FR_LMTN is received (FPINFLE=0).

Flag, C-Port Repeat Path Enabled (FPRPT)

If FPRPTO=1 or the C-Port is supporting only 4 Mbit/s and 16 Mbit/s (the C-Port has a PHY path), then the flag FPRPT is used to signal the Transmit FSM to configure into a repeat path. When FPRPT is set to 1, the Transmit FSM sets FPTI=0 for all media rates and FPTXC=0 for the 4 Mbit/s and 16 Mbit/s media rates, creating a repeat path for use by the Station during a Lobe Media Test. When FPRPT is set to 0, the Transmit FSM will set FPTI=1 for all media rates and FPTXC=1 for the 4 Mbit/s and 16 Mbit/s media rates, returning the Transmit FSM to its normal operating mode for the TXI Access Protocol.

If FPRPTO=0 (there is a C-Port PMAC lobe test repeat mechanism), then the flag FPRPT has no effect upon the C-Port operation.

FPRPT is set and reset only by the Join FSM.

Flag, C-Port Signal Loss (FPSL)

The flag FPSL indicates the presence or absence of a valid signal from the lobe as defined in 5.1.4.1. The FPSL is set to 1 to indicate the absence of a valid signal when the PMAC detects PM_STATUS.indication(Signal_detected=Signal_loss) for the entire period of timer TPSL (signal loss is filtered). The FPSL is set to 0 to indicate the presence of a valid signal whenever PMAC detects PM_STATUS.indication(Signal_detected=Signal_acquired).

Flag, C-Port Signal Loss Detected (FPSLD)

The flag FPSLD is used to determine whether the PMAC Signal Loss Filtering process is active or inactive. The Signal Loss Filtering process is used to determine whether or not the PHY signal loss event is a steady-state condition. FPSLD is set to 1 to activate the Signal Loss Filtering process, if not already active whenever the PMAC detects PM_STATUS.indication(Signal_detected=Signal_loss). The FPSLD is set to 0 to deactivate the Signal Loss Filtering process whenever the PMAC detects PM_STATUS.indication(Signal_detected=Signal_acquired).

Flag, C-Port Transmit Abort Sequence (FPTAS)

The flag FPTAS is used to control the counting of Abort Sequences. When the transmitter releases an Abort Sequence, it sets FPTAS to 1. The C-Port Error Handling Station Operation Table detects this condition, sets FPTAS to 0, and takes the appropriate action to increment the counter CPABE.

Flag, C-Port Transmit Idles (FPTI)

The flag FPTI is used to control the transmission of idles (Fill). The TXI Access Protocol normally has the flag FPTI set to 1 (indicates PS_CONTROL.request(Repeat_mode=Fill)), which causes the C-Port to source fill. FPTI is set to 0 (indicates PS_CONTROL.request (Repeat_mode=Repeat)), when

a) the Transmit FSM is transmitting data (TS=PTXD)
b) the Transmit FSM is supporting LMT by providing a repeat path (TS=PRPT)
c) the PMAC exits to the TKP Access Protocol
d) the PMAC closes by entering the Bypass state (JS=BP).

Flag, C-Port Transmit from Crystal (FPTXC)

The flag FPTXC is used to control whether the C-Port is deriving its transmit timing reference from its crystal or from its received signal. When FPTXC is set to 1, the PMAC is using its crystal as the source of its transmit timing reference (indicates PS_CONTROL.request(Crystal_transmit=Asserted)) and has added the elastic and latency buffers into the data path. When FPTXC is set to 0, the PMAC is using its receiver's

clock recovery circuits as the source of its transmit timing reference (indicates PS_CONTROL.request(Crystal_transmit=Not_asserted)) and has removed the elastic and fixed latency buffers from the data path.

Flag, C-Port Transmit Length (FPTX_LTH)

The flag FPTX_LTH is used by the PMAC to determine if the frame length of the currently transmitting frame is known. This flag is part of the notation used in describing cut-through support for a DTU. FPTX_LTH is set to 1 when the length of the currently transmitting frame is known. FPTX_LTH is set to 0 when the length of the currently transmitting frame is not known.

9.3.3.3 PMAC States

There are a set of states for the Join Ring FSM, the Monitor FSM, and the Transmit FSM. A FSM can be in only one state at any time.

9.3.3.3.1 C-Port Join States

The C-Port Join State (JS=) notation is used to identify the current state of the C-Port Join FSM. The C-Port Join State values are Bypass, Registration, Await Neighbor Notification Complete, Lobe Test, Duplicate Address Check, Join Complete - TXI, Join Complete - TKP, Registration Query, and Duplicate Address Detected. In the Bypass State, normal operation is suspended and no assumptions can be made regarding the transmission or reception of data. Join states, listed by state value, are defined as follows:

Join State J0, Bypass (JS=BP)

This is the idle state for the C-Port. In this state, the C-Port waits for the Connect request (Connect.PMAC) and is not required to perform any other functions. The setting of the policy flag FPOTO determines if the C-Port operates in station emulation mode (FPOTO=0) defined in 9.2 and 9.5, or operates in port mode (FPOTO=1) defined in 9.3 and 9.4.

Join State JK, C-Port Registration (JS=PREG)

In this state, the C-Port waits for a station to either send a registration frame or raise Phantom. If the Station sends a Registration Request frame to the C-Port, the C-Port will process this frame and respond with a Registration Response frame. If the TXI Access Protocol is requested, the C-Port will enter the Lobe Test state (JS=PLT).

A Station signals that it is using the TKP Access protocol by raising phantom. When phantom is detected by the C-Port, a Claim Token MAC frame is sent and the Join FSM enters the Await Neighbor Notification Complete state (JS=PANNC).

Join State JN, C-Port Await Neighbor Notification Complete (JS=PANNC)

In this state, the C-Port waits until the Station has completed Neighbor Notification. If the C-Port times out waiting for Neighbor Notification to complete, it will return to Port Registration. During Neighbor Notification, the C-Port determines if the Station's address is a duplicate of the C-Port's address. If the Station's address is a duplicate, the C-Port enters the C-Port Duplicate Address Detected State (JS=PDAD).

If Neighbor Notification completes without a duplicate address being detected, the C-Port enters Registration Query (JS=PRQ) if the C-Port supports the TXI Access Protocol. Otherwise the C-Port enters the Join Complete (JS=PJCP) state.

Join State JL, C-Port Lobe Test (JS=PLT)

In this state, the C-Port assists the Station in performing the test on the attached Lobe by providing a simple repeat path capable of repeating either frames (any media rate) or tokens (4 Mbit/s and 16 Mbit/s only). The Station is responsible for determining if the lobe passes or fails this test. If the Station determines that the lobe passes the test, the Station will issue an Insert Request. If the C-Port times out during this state (TPLMTR=E), the Station has failed the test, and the C-Port enters the Registration state (JS=PREG).

Join State JM, C-Port Duplicate Address Check (JS=PDAC)

In this state, the C-Port responds to the Insert Request frame sent by the Station at the end of the Lobe Media test. If the DTU has completed the duplicate address check and returned its response to the MAC, the C-Port will issue an Insert Response with the appropriate DTR Response Code subvector. If the duplicate address check passes, then the C-Port enters the Port Join Complete - TXI state (JS=PJCI). If the check fails, the C-Port enters the Bypass state (JS=BP).

Join State JP, C-Port Join Complete—TXI (JS=PJCI)

In this state, the C-Port has completed the join process and is fully operational on a dedicated connection using the TXI Access Protocol. In this state the C-Port may pass LLC frames to the DTU for forwarding.

Join State JQ, C-Port Join Complete—TKP (JS=PJCP)

In this state, the C-Port has completed the join process and is fully operational on a dedicated connection using the TKP Access Protocol. In this state the C-Port may pass LLC frames to the DTU for forwarding.

Join State JR, C-Port Registration Query (JS=PRQ)

In this state, the C-Port transmits Registration Query MAC frames allowing the Station to decide if it wants to continue using the TKP Access Protocol, or to switch to the TXI Access Protocol. The station acknowledges a requested change to the TXI Access Protocol by dropping the phantom signal to the C-Port. When phantom signal is lost, the C-Port returns to the Registration state (JS=PREG). The C-Port exits to Join Complete - TKP (JS=PJCP) if the Station does not drop phantom.

Join State JT, C-Port Duplicate Address Detected (JS=PDAD)

In this state, the C-Port is waiting for a station, whose address is a duplicate of the C-Port's to drop its phantom signal. Once the Station drops its phantom signal, the C-Port enters the Registration State (JS=PREG).

Join State JU, C-Port High Media Rate Trade-up (JS=PHMRTU)

This state is entered when the Registration state (JS=PREG) detects the Station requesting Trade-up from 4 Mbit/s or 16 Mbit/s operation to 100 Mbit/s operation. If 100 Mbit/s Link status becomes active, then exit to the Registration state (JS=PREG) to restart the Registration state (JS=PREG) at 100 Mbit/s. If Link Status fails to become active before the timer TPHMRW expires, then exit to the Bypass state (JS=BP).

Join State JW, C-Port Remove Alert Wait (JS=PRAW)

This state is entered when the C-Port in the Join Complete state (JS=PJCI) detects a condition that allows the C-Port to notify the Station it is entering the Bypass state. The initial Remove Alert MAC frame is transmitted by detection of the error condition that causes the C-Port to enter the Remove Alert Wait state, while counter CPRAT controls the number of Remove Alert MAC frame transmission retries in the Remove Alert Wait state. When counter CPRAT reaches zero, the C-Port enters the Bypass state (JS=BP).

9.3.3.3.2 C-Port Monitor States

The Monitor State (MS=) notation is used to identify the current state of the C-Port Monitor FSM. The monitor state values are Operational, Transmit Beacon, and Internal Test. Monitor states, listed by state value, are defined as follows:

Monitor State MJ, C-Port Operational (MS=POPT)

This is the normal operating state for the C-Port Monitor FSM. In this state the link is operational and the Heart Beat Function, described in 9.1.9, is used to inform the Station that the PMAC is running.

Monitor State MK, C-Port Transmit Beacon (MS=PTBN)

The C-Port enters this state when it detects Loss of Heart Beat on the link. There are two beacon types defined for TXI Access Protocol: Loss of signal and Loss of Heart Beat. The C-Port stays in this state until

— The C-Port receives a beacon frame from the attached Station.
— The Internal Test Timer (TPIT) has expired.

While in this state, the C-Port issues beacon frames with the appropriate beacon type indicated. The frames are paced by a timer (TPQP). Exit from this state is to Internal Test.

Monitor State ML, C-Port Internal Test (MS=PIT)

The Internal Test state is entered from the Transmit Beacon state (MS=PTBN) when timer TPIT expires, or the Operational state (MS=POPT) when a Beacon frame is received. In this state, the C-Port performs its internal tests, which must be completed within 1.2 s. When the C-Port detects loss of phantom signal, the Internal Test state sets the flag FPBNT=1 to signal the Join FSM to support the Station during its Lobe Media Test by providing a Repeat path. When FPBNT=1, the Join FSM re-enters its Lobe Test state (JS=PLT) following the same sequence the Join FSM followed during the normal Join process by repeating the transitions from JS=PLT to JS=PDAC to JS=PJCI. The only exception is for the Duplicate Address Check, which is not performed. When FPBNT=1 and the Port's internal tests are successful, the C-Port always responds to the Station's Insert Request with a positive (DTR_RSP=0) Insert Response MAC frame. The Monitor FSM enters the Operational state (MS=POPT) when a valid Insert Request MAC frame is received from the attached Station (indicating the Station successfully recovered from its Hard Error Recovery process).

9.3.3.3.3 C-Port Transmit States

The Transmit State (TS=) notation is used to identify the current state of the transmit FSM. The transmit state values are Transmit Normal, Transmit Data (of a frame), and Repeat. Transmit states are defined as follows:

Transmit State TD, C-Port Transmit Normal (TS=PTXN)

Transmit Normal is the rest state for the Transmit FSM. This state services transmit immediate and queued frame requests by first transmitting the SFS field and then entering the Transmit Frame Data State (TS=TPXD).

Queued frames will be serviced only if the C-Port is operational (FPOP=1).

The Join FSM can request that the Transmit FSM enter the Repeat State. This state is used to support Lobe Media Test. The flag FPRPT is used to signal this request from the Join FSM.

Transmit State TE, C-Port Transmit Frame Data (TS=PTXD)

In this state, the Transmit FSM transmits the data portion (FC, DA, SA, RI (if present), INFO (if present), and FCS fields) of the frame. It then sends the EFS field, sets FPEFS to 1, indicating to the Join FSM that the EFS has been transmitted (see 9.2.2.3), and enters the Transmit Normal State (JS=PTXN).

At 100 Mbit/s, the PS_CONTROL.request(Transmit_mode=No_fill) signal, defined in 9.8.1.1.4, turns off the transmission of idles and the frame's data is transmitted, one octet at a time, using the signal PS_UNITDATA.request(Tx_indicator=Data_byte), defined in 9.8.1.1.2.

NOTE—The PM_CONTROL.request(Transmit_mode=No_fill) signal defined in 9.8.1.1.7, does not include a Transmit_mode action and therefore cannot be used to control Transmit_mode.

At 1000 Mbit/s, the PS_CONTROL.request(Transmit_mode=No_fill) signal, defined in 9.8.2.1.4, turns off the transmission of idles and the frame's data is transmitted, one octet at a time, using the signal PS_UNITDATA.request(Tx_indicator=Data_byte), defined in 9.8.2.1.2.

Transmit State TF, C-Port Repeat (TS=PRPT)

The Repeat State is used by the C-Port to support the Station's Lobe Media Test. Entry and exit to this state is controlled by the Join FSM by either directly forcing a state transition or by use of flag FPRPT.

9.3.4 C-Port Port Operation Tables

This subclause specifies the procedures that are used in the PMAC for the C-Port operating in Port mode. The Join FSM supports both the TXI and the TKP Access Protocols. The remaining tables support only the TXI protocol. These Port Operation Tables use the terms (optional), (optional-i), (optional-x) and (optional-unk) defined in 9.1.1.2.

Each Port Operation Table starting point has its event/condition shaded and each Port Operation Table exit point has its action/output shaded.

To allow flexibility among station implementations, parameter n9 is used to represent the value of CPRAT.

Parameter	MIN	MAX	Used With	Description
n9	5	10	CPRAT	n9 is the initial setting of CPRAT which governs the number of Remove Alert MAC Frames transmitted by the C-Port operating at the High Media Rate before exiting to the Bypass state (JS=BP).

9.3.4.1 C-Port Join Port Operation Table

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
J01	1002	**Connect.PMAC** & FPOTO=0 & FSREGO=0 & JS=BP << C-Port Emulation of a DTR Station using the TKP Access Protocol, exit to 9.5. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=LT; Set_initial_conditions; FTI=*x*; FTXC=1; FIPTKPS=1; TEST; [TLMTR=R (optional-i)]
J0A	1001	**Connect.PMAC** & FPMRO<2 & FPOTO=0 & FSREGO=1 & JS=BP << C-Port Emulation of a DTR Station using the TXI Access Protocol, exit to 9.2. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; FSMR=FPMRO; FPMR=FPMRO; FIPTXIS=1; TSIS=R
J0A	1107	**Connect.PMAC** & PS_STATUS.indication(Link_status=Asserted) & FPMRO>1 & FPOTO=0 & FSREGO=1 & JS=BP << This transition requires Link_status to be active before Connect.PMAC operates. >> << One of the Starting Points for the C-Port in Station Emulation Mode using the TXI Access Protocol. >> << C-Port Emulation of a DTR Station using the TXI Access Protocol, exit to 9.2. >> << High Media Rate only >>	JS=SREG; TS=STXN; Set_initial_conditions; FSTXC=FSTI=1; FSMR=FPMRO; FPMR=FPMRO; FIPTXIS=1; TSIS=R
J0KA	1000	**Connect.PMAC** & FPMRO<2 & FPOTO=1 & JS=BP << Starting Point for C-Port Operation. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PREG; TS=PRPT; Set_initial_conditions; FPMR=FPMRO; FPRPT=1 << TXI-only configured C-Port shall cause a lobe test failure in a station opening with the TKP Access Protocol. >>
J0KB	1108	**Connect.PMAC** & PS_STATUS.indication(Link_status=Asserted) & FPMRO>1 & FPOTO=1 & JS=BP << This transition requires Link_status to be active before Connect.PMAC operates. >> << Starting Point for C-Port Operation using the TXI Access Protocol. >> << High Media Rate only >>	JS=PREG; TS=PRPT; Set_initial_conditions; FPTXC=1; FPMR=FPMRO; FPRPT=1
JN0	1018	**Disconnect.PMAC** & JS=PANNC	JS=BP
JM0	1040	**Disconnect.PMAC** & FPMR<2 & JS=PDAC << 4 Mbit/s and 16 Mbit/s only >>	JS=BP

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JM0	1155	**Disconnect.PMAC** & FPMR>1 & FPJC=0 & JS=PDAC << High Media Rate only >>	JS=BP
JMW	1152	**Disconnect.PMAC** & FPMR>1 & FPJC=1 & JS=PDAC << High Media Rate only >>	JS=PRAW; CPRAT=n9; TPRAP=R; TXI_RMV_ALRT
JT0	1103	**Disconnect.PMAC** & JS=PDAD	JS=BP
JP0	1056	**Disconnect.PMAC** & FPMR<2 & JS=PJCI << 4 Mbit/s and 16 Mbit/s only >>	JS=BP
JPW	1118	**Disconnect.PMAC** & FPMR>1 & JS=PJCI << After Join Complete, C-Port told by Port Management to remove from the network. >> << High Media Rate >>	JS=PRAW; FPOP=0; CPRAT=n9; TPRAP=R; TXI_RMV_ALRT
JQ0	1061	**Disconnect.PMAC** & JS=PJCP	JS=BP
JL0	1026	**Disconnect.PMAC** & FPMR<2 & JS=PLT << 4 Mbit/s and 16 Mbit/s only >>	JS=BP
JL0	1156	**Disconnect.PMAC** & FPMR>1 & FPJC=0 & JS=PLT << High Media Rate only >>	JS=BP
JLW	1153	**Disconnect.PMAC** & FPMR>1 & FPJC=1 & JS=PLT << High Media Rate only >>	JS=PRAW; CPRAT=n9; TPRAP=R; TXI_RMV_ALRT
JK0	1007	**Disconnect.PMAC** & JS=PREG	JS=BP
JR0	1010	**Disconnect.PMAC** & JS=PRQ	JS=BP
	1037	**DTU_DAC.response(RC)** & JS=PDAC	FPDTUREQ=0; SDAC_RC=RC
	1022	**DTU_DAC.response(RC)** & JS=PLT	FPDTUREQ=0; SDAC_RC=RC
	359	**FDC=1** & FNC=0 & MS=RPT & FAM=1	[FNC=1 (optional)]
	027	**FDC=1** & FNW=1 & FNC=0 & MS=RPT & FAM=0	FNC=1; QUE_SMP_PDU
	028	**FDC=1** & FNW=1 & FNC=0 & MS=RPT & FAM=1	FNC=1
JQ0	1068	**FIPTKPPE=1** & JS=PJCP << Error running configuration 3, DTR C-Port in port mode, TKP AP. >>	JS=BP

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JNQ	1015	**FNC=1 & AND(PPV(AP_MASK),0002)=0000** & JS=PANNC << The C-Port is not configured by management to support the TXI Access Protocol, thus must not execute the Registration Query protocol. >>	JS=PJCP; FINS=FJR=FPJC=1 << C-Port Join complete using TKP Access Protocol on a dedicated link. >>
JNR	1085	**FNC=1 & AND(PPV(AP_MASK),0002)=0002** & JS=PANNC <<Neighbor notification complete, ready to start registration query protocol. >>	JS=PRQ; QUE_REG_QRY; CPRQ=4; TPQP=R; **If** FPBHO=0 then FINS=1
JPLA	1051	**FPBNT=1** & FPMR<2 & JS=PJCI << 4 Mbit/s and 16 Mbit/s only >>	JS=PLT; FPBNT=0; FPRPT=1; TPLMTR=R << Prepare for Station's LMT by providing a repeat path and start LMT duration timer. >>
JPLB	1109	**FPBNT=1** & FPMR>1 & JS=PJCI << High Media Rate only >>	JS=PLT; FPBNT=0; FPRPT=1; **If** FPRPTO=0 then FA(TEST)=1; TPLMTR=R << Prepare for Station's LMT by providing either a PHY repeat path (FPRPTO=1) or a PMAC repeat path (FPRPTO=0) and start LMT duration timer. >>
JM0	1046	**FPBPF=1 & TS=PTXN** & JS=PDAC	JS=BP
JP0	1058	**FPBPF=1 & TS=PTXN** & JS=PJCI	JS=BP
JL0	1032	**FPBPF=1 & TS=PTXN** & JS=PLT	JS=BP
JW0	1154	**FPBPF=1 & TS=PTXN** & JS=PRAW	JS=BP
JK0	1009	**FPBPF=1 & TS=PTXN** & JS=PREG	JS=BP
JN0	1021	**FPBPF=1 & TS=RPT** & JS=PANNC	JS=BP
JQ0	1063	**FPBPF=1 & TS=RPT** & JS=PJCP	JS=BP
JR0	1093	**FPBPF=1 & TS=RPT** & JS=PRQ	JS=BP
	1036	**FPEFS=1** & FPMR<2 & FPBPW=0 & FPRPT=0 & JS=PLT << Signaling from Transmit FSM that data has been transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	FPRPT=1 << Signal Transmit FSM to enter Repeat state to support the Station's LMT. >>
	1110	**FPEFS=1** & FPMR>1 & FPBPW=0 & FPRPT=0 & FPRPTO=1 & JS=PLT << Signaling from Transmit FSM that data has been transmitted. >> << High Media Rate only >>	FPRPT=1 << Signal Transmit FSM to enter Repeat state to support the Station's LMT. >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JM0	1075	**FPEFS=1** & FPBPW=1 & JS=PDAC	JS=BP << Station rejected by C-Port that closes after INS_RSP has been transmitted. >>
JL0	1083	**FPEFS=1** & FPBPW=1 & JS=PLT	JS=BP << Port closes after sending Registration Response MAC in response to an unexpected Registration Request frame while in Hard Error Recovery. See REF 1092. >>
	1072	**FPEFS=1** & FPRPT=0 & JS=PREG	FPRPT=1 << Re-establish repeat path after transmitting frame. >>
JQ0	1066	**FPINSD=0** & FBR=1 & MS=RBN & JS=PJCP	JS=BP << Station drops phantom for a second time while in Hard Error Recovery. >>
JQ0	1069	**FPINSD=0** & FBT=1 & MS=TBN & JS=PJCP	JS=BP << Station drops phantom for a second time while in Hard Error Recovery. >>
JP0	1049	**FPINSD=0** & FPINSLE=1 & FPOP=1 & JS=PJCI	JS=BP <<Station deinserted – normal condition. >>
JNK	1017	**FPINSD=0** & JS=PANNC << Station closed – unknown reason >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; SUA=0; FA(monitor)=0
JTK	1099	**FPINSD=0** & JS=PDAD	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; SUA=0; FA(monitor)=0
JRK	1089	**FPINSD=0** & JS=PRQ << Registration Query Protocol >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; FPTXC=0; SUA=0; FA(monitor)=0
JP0	1033	**FPINSD=0** & FPINSLE=1 & MS=PTBN & JS=PJCI	JS=BP << Station Closed >>
JQ0	1012	**FPINSD=0** & MS=RCT & JS=PJCP << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station Closed >>
JQ0	1071	**FPINSD=0** & MS=RPT & JS=PJCP << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station Closed >>
JQ0	1013	**FPINSD=0** & MS=TCT & JS=PJCP << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station Closed >>
JQ0	1014	**FPINSD=0** & MS=TRP & JS=PJCP << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Station Closed >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JKN	1006	**FPINSD=1** & AND(PPV(AP_MASK),0001)=0001& JS=PREG << Classic Station or DTR Station using TKP Access Protocol, where the C-Port supports a station using TKP Access Protocol. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PANNC; MS=TCT; TS=RPT; FPTI=0; FIPTKPP=1; FDC=FTI=FOP=FTXC=1; TCT=R; TQP=R; CCT=1; CCR=1; TXI(CT_PDU) << FIPTKPP=1 is used by the C-Port TKP Transmit FSM. >> << C-Port starts up the TKP Access Protocol Monitor and Transmit FSMs - See 9.4. >>
	1105	**FR_AC** & AND(PPV(AP_MASK),0001)=0000 & FPMR<2 & FPBLT=0 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	FPBLT=1; TPBLT=R << Start sequence to break attached station's lobe test. >>
	1101	**FR_AC** & FPDLT=1 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	TPDLT=R << Frame detected during lobe test disruption, extend disruption period by restarting TPDLT. >>
JM0	1044	**FR_AMP** & JS=PDAC	JS=BP << Protocol Error >>
JP0	1052	**FR_AMP** & JS=PJCI	JS=BP << Protocol Error >>
JL0	1030	**FR_AMP** & JS=PLT	JS=BP << Protocol Error >>
JNT	1097	**FR_AMP(SA=MA)** & FAM=0 & JS=PANNC	JS=PDAD; Set_initial_conditions << Duplicate Address Detected. >>
JR0	1065	**FR_BN** & FPBHO=1 & JS=PRQ	JS=BP << Protocol Error >>
JN0	1020	**FR_BN** & JS=PANNC	JS=BP << Protocol Error >>
JM0	1041	**FR_BN** & JS=PDAC	JS=BP << Protocol Error >>
JL0	1027	**FR_BN** & JS=PLT	JS=BP << Protocol Error >>
JM0	1043	**FR_CT** & JS=PDAC	JS=BP << Protocol Error >>
JP0	1053	**FR_CT** & JS=PJCI	JS=BP << Protocol Error >>
JL0	1029	**FR_CT** & JS=PLT	JS=BP << Protocol Error >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1074	FR_INS_REQ(SA=SUA) & FPJC=0 & FPDTUREQ=0 & JS=PDAC	TPIRD=R; **If** SDAC_RC=8020 then FPHBA=0 << Start timer to send INS_RSP >> << Disable Heart Beat since join will not complete. >>
	1077	**FR_INS_REQ(SA=SUA)** & FPJC=0 & FPDTUREQ=0 & SDAC_RC=0000 & JS=PLT	FPHBA=1; TPRHB=R; TPIRD=R; TPQHB=R << Heart Beat started, start timer to transmit INS_RSP. >>
	1078	**FR_INS_REQ(SA=SUA)** & FPJC=0 & FPDTUREQ=0 & SDAC_RC=8020 & JS=PLT	TPIRD=R << Heart Beat not started since join will not complete, start timer to transmit INS_RSP. >>
	1079	**FR_INS_REQ(SA=SUA)** & FPJC=0 & FPDTUREQ=1 & JS=PLT	FPHBA=1; TPRHB=R; TPQHB=R << Heart Beat started, no response from DTU. >>
JLMA	1023	FR_INS_REQ(SA=SUA) & FPJC=0 & JS=PLT << End of LMT Success! >>	JS=PDAC; MS=POPT; FPRPT=0; **If** FPMR<2 then FPTXC=1; **If** FPRPTO=0 then FA(TEST)=0 << Clock change for 4 Mbit/s and 16 Mbit/s only. >>
JLMB	1073	**FR_INS_REQ(SA=SUA)** & FPMR<2 & FPJC=1 & JS=PLT <<Successful completion of LMT after Hard Error Recovery. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PDAC; FPHBA=FPTXC=1; FPRPT=0; TPRHB=R; TPIRD=R; TPQHB=R << Clock change, Heart Beat started, start timer to transmit INS_RSP. >>
JLMC	1121	**FR_INS_REQ(SA=SUA)** & FPMR>1 & FPJC=1 & JS=PLT <<Successful completion of LMT after Hard Error Recovery. >> << High Media Rate only >>	JS=PDAC; FPHBA=1; FPRPT=0; **If** FPRPTO=0 then FA(TEST)=0; TPRHB=R; TPIRD=R; TPQHB=R << If PHY repeat path is active set inactive, if LMT FA is active set inactive, Heart Beat started, start timer to transmit INS_RSP. >>
	1050	**FR_INS_REQ(SA=SUA)** & FPOP=1 & JS=PJCI	TPIRD=R << Assured delivery of the Insert Response MAC frame. >>
	1142	**FR_LMTN(DA=broadcast)** & FPRPTO=0 & JS=PLT << PMAC Repeat path is being supported. Station requests the PMAC to support its LMT test function. >>	TXI_LMTN_PDU << Return LMT Notification Frame to the Station. >>
JM0	1060	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=00)** & JS=PDAC	JS=BP << Protocol Check >

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JP0	1055	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=00)** & JS=PJCI	JS=BP << Protocol Check >>
JL0	1059	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=00)** & JS=PLT	JS=BP << Protocol Check >>
JM0	1082	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=30)** & JS=PDAC	JS=BP << Protocol Check >>
JP0	1084	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=30)** & JS=PJCI	JS=BP << Protocol Check >>
JL0	1090	**FR_MAC(DA=any_recognized_address & SA<>SUA & VC=30)** & JS=PLT	JS=BP << Protocol Check >>
	1080	**FR_REG_REQ** & AND(PPV(PD_MASK),PD)=0000 & JS=PREG << Access Denied, unsupported out-of-band signaling. >>	FPBLT=FPEFS=FPRPT=0; TXI_REG_RSP_PDU(AP_RSP=0000)
	1004	**FR_REG_REQ** & AND(PPV(AP_MASK),AP_REQ)=0000 & JS=PREG << Access Denied by C-Port, unsupported protocol. >>	FPBLT=FPEFS=FPRPT=0; TXI_REG_RSP_PDU(AP_RSP=0000)
	1092	**FR_REG_REQ** & FPJC=1 & JS=PLT << Unexpected Registration Request received, possible Station error. >>	FPBPW=1; FPEFS=0; TXI_REG_RSP_PDU(AP_RSP=0000) << Reception of this frame may cause the Station to close. >>
JLK	1034	**FR_REG_REQ(AP_REQ<>S_AP)** & FPJC=0 & JS=PLT	JS=PREG; MS=x; TS=PRPT; Set_initial_conditions; FPRPT=1; SUA=0
	1005	**FR_REG_REQ & AND(AP_REQ,0001)=0001** & JS=PREG << Invalid AP_REQ value. >>	FPBLT=FPEFS=FPRPT=0; TXI_REG_RSP_PDU(AP_RSP=0000)
JKLA	1003	**FR_REG_REQ(AP_REQ=0002 & PD=0001)** & FPMR<2 & AND(PPV(AP_MASK),AP_REQ)=0002 & AND(PPV(PD_MASK),PD)=0001 & JS=PREG <<Station requesting TXI Access Protocol which is supported by this C-Port. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PLT; FPDTUREQ=1; FPBLT=FPEFS=FPRPT=0; TPLMTR=R; SPD=PD; S_AP=AP_REQ; SIAC=IAC; SUA=SA; TXI_REG_RSP_PDU(AP_RSP=0002); DTU_DAC.request(SA, SIAC)

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JKLB	1113	**FR_REG_REQ(AP_REQ=0002 &PD=0001)** & FPMR>1 & AND(PPV(AP_MASK),AP_REQ)=0002 & AND(PPV(PD_MASK),PD)=0001 & JS=PREG <<Station requesting TXI Access Protocol which is supported by this C-Port with Phantom Drive. >> << 100 Mbit/s only >>	JS=PLT; FPDTUREQ=1; FPBLT=FPEFS=FPRPT=0; TPLMTR=R; SPD=PD; S_AP=AP_REQ; SIAC=IAC; SUA=SA; **If** FPRPTO=0 then FA(TEST)=1; TXI_REG_RSP_PDU(AP_RSP=0002); DTU_DAC.request(SA, SIAC) << FPRPTO=0: PMAC Repeat path is supported. >>
JKLB	1114	**FR_REG_REQ(AP_REQ=0002 & PD=0002)** & FPMR>1 & AND(PPV(AP_MASK),AP_REQ)=0002 & AND(PPV(PD_MASK),PD)=0002 & JS=PREG <<Station requesting TXI Access Protocol which is supported by this C-Port *without* Phantom Drive. >> << High Media Rate only >>	JS=PLT; FPDTUREQ=1; FPBLT=FPEFS=FPRPT=0; TPLMTR=R; SPD=PD; S_AP=AP_REQ; SIAC=IAC; SUA=SA; **If** FPRPTO=0 then FA(TEST)=1; TXI_REG_RSP_PDU(AP_RSP=0002); DTU_DAC.request(SA, SIAC) << FPRPTO=0: PMAC Repeat path is supported. >>
JKLA	1131	**FR_REG_REQ(AP_REQ=0006 & PD=0001)** & FPMR<2 & AND(PPV(AP_MASK),AP_REQ)=0002 & AND(PPV(PD_MASK),PD)=0001 & JS=PREG <<Station operating at the 4 Mbit/s or 16 Mbit/s media rate is requesting TXI Access Protocol for possible Trade-up to 100 Mbit/s which is not supported by this C-Port. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PLT; FPDTUREQ=1; FPBLT=FPEFS=FPRPT=0; TPLMTR=R; SPD=PD; S_AP=0002; SIAC=IAC; SUA=SA; TXI_REG_RSP_PDU(AP_RSP=0002); DTU_DAC.request(SA, SIAC) << C-Port continues to support 4 Mbit/s or 16 Mbit/s request for TXI Access Protocol operation. >>
JKU	1132	**FR_REG_REQ(AP_REQ=0006 & PD=0001)** & FPMR<2 & AND(PPV(AP_MASK),AP_REQ)=0006 & JS=PREG <<Station operating at the 4 Mbit/s or 16 Mbit/s media rate is requesting TXI Access Protocol for possible Trade-up to 100 Mbit/s which is supported by this C-Port. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PHMRTU; FPRPT=0; S_AP=AP_REQ; SPD=PD; TPTUAD=R; TPHMRW=R; TXI_REG_RSP_PDU(AP_RSP=0004) << Respond and enter a wait state in case the Station misses this response and retransmits its request. >>
JUKA	1148	**FR_REG_REQ(AP_REQ<>S_AP)** & JS=PHMRTU << Restart registration - Station has changed its Access Protocol request. >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FPRPT=1; SUA=0
	1149	**FR_REG_REQ(AP_REQ=S_AP & PD=SPD)** & JS=PHMRTU << Handle the assured delivery mechanism while waiting to trade up to 100 Mbit/s. >>	TXI_REG_RSP_PDU(AP_RSP=0004)

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1025	**FR_REG_REQ(AP_REQ=S_AP & PD=SPD)** & FPJC=0 & JS=PLT	FPEFS=FPRPT=0; TPLMTR=R; TXI_REG_RSP_PDU(AP_RSP=S_AP) << Assured delivery of Registration Response Frame. >>
	1067	**FR_REG_REQ(AP_REQ>0006)** & AND(PPV(AP_MASK),AP_REQ)>0 & JS=PREG << Access denied by C-Port, invalid AP_REQ. >>	FPBLT=FPEFS=FPRPT=0; TXI_REG_RSP_PDU(AP_RSP=0000)
JLK	1091	**FR_REG_REQ(PD<>SPD)** & FPJC=0 & JS=PLT	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FPRPT=1; SUA=0
JUKA	1151	**FR_REG_REQ(PD<>SPD)** & JS=PHMRTU	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FPRPT=1; SUA=0 << Restart registration - Station has changed its Phantom capability request. >>
	1144	**FR_REG_REQ(PD>0002)** & AND(PPV(PD_MASK),PD)>0 & AND(PPV(AP_MASK),AP_REQ) >0 & JS=PREG	FPBLT=FPEFS=FPRPT=0; TXI_REG_RSP_PDU(AP_RSP=0000)
JM0	1157	**FR_RMV_ALRT(VC=30 & SA=SUA)** & FPMR>1 & JS=PDAC << Received request indicating Station is being removed from the link. >> << High Media Rate only >>	JS=BP
JP0	1120	**FR_RMV_ALRT(VC=30 & SA=SUA)** & FPMR>1 & JS=PJCI << Received request indicating Station is being removed from the link. >> << High Media Rate only >>	JS=BP
JL0	1158	**FR_RMV_ALRT(VC=30 & SA=SUA)** & FPMR>1 & JS=PLT << Received request indicating Station is being removed from the link. >> << High Media Rate only >>	JS=BP
JM0	1042	**FR_RP** & JS=PDAC << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Protocol Error >>
JP0	1054	**FR_RP** & JS=PJCI << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Protocol Error >>
JL0	1028	**FR_RP** & JS=PLT << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Protocol Error >>
JNT	1098	**FR_SMP(SA=MA)** & FAM=1 & JS=PANNC	JS=PDAD; Set_initial_conditions << Duplicate Address Detected. >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1143	**FR_TEST(DA=FA(TEST))** & FPRPTO=0 & JS=PLT << PMAC Repeat path being supported. >>	TXI_LMT_PDU << Return TEST Frame to the Station. >>
JR0	1011	**INTERNAL_ERR(not_correctable)** & JS=PRQ	JS=BP
JN0	1019	**INTERNAL_ERR(not_correctable)** & JS=PANNC	JS=BP
JM0	1045	**INTERNAL_ERR(not_correctable)** & JS=PDAC	JS=BP
JT0	1104	**INTERNAL_ERR(not_correctable)** & JS=PDAD	JS=BP
JP0	1057	**INTERNAL_ERR(not_correctable)** & JS=PJCI	JS=BP
JQ0	1062	**INTERNAL_ERR(not_correctable)** & JS=PJCP	JS=BP
JL0	1062	**INTERNAL_ERR(not_correctable)** & JS=PLT	JS=BP
JK0	1008	**INTERNAL_ERR(not_correctable)** & JS=PREG	JS=BP
JP0	1064	**Internal_Test_Fail** & MS=PIT & JS=PJCI	JS=BP
JUKB	1137	**PS_STATUS.indication (Link_status=Asserted)** & JS=PHMRTU << The 100 Mbit/s link has become active after C-Port and Station Trade-up agreement. >>	JS=PREG; TS=PRPT; Set_initial_conditions; FPTXC=1; FPRPT=1; FPMR=2 << Restart registration as if this is initial entry. >>
JM0	1133	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=PDAC << Station link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP
JP0	1134	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=PJCI << Station link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP << Remove Alert MAC frame is not sent because the C-Port to Station link is inoperative. >>
JL0	1135	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=PLT << Station link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP
JW0	1145	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=PRAW << Station link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JK0	1136	**PS_STATUS.indication (Link_status=Not_asserted)** & JS=PREG << Station link was operational, but is now not operational. >> << High Media Rate only >>	JS=BP
JNK	1070	**TCT=E** & MS=RCT & JS=PANNC << Claim Token failed. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; SUA=0; FA(monitor)=0 << C-Port enters Registration as if the Station had not asserted its Phantom signal. >>
JNK	1081	**TCT=E** & MS=TCT & JS=PANNC << Claim Token failed. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PREG; MS=x; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; SUA=0; FA(monitor)=0 << C-Port enters Registration as if the Station had not asserted its Phantom signal. >>
	1094	**TK_AC** & AND(PPV(AP_MASK),0001)=0000 & FPMR<2 & FPBLT=0 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	[FPBLT=1; TPBLT=R (optional-i)] << Start sequence to break attached station's lobe test. >>
	1100	**TK_AC** & FPDLT=1 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	[TPDLT=R (optional-i)] << Token detected during lobe test disruption, extend disruption period by restarting TPDLT. >>
	1095	**TPBLT=E** & FPBLT=1 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	FPRPT=0; FPDLT=1; TPDLT=R << Force the Transmit FSM to TS=PTXN, by setting FPRPT to zero, and an attached station's lobe test is disrupted. >>
	1096	**TPDLT=E** & FPBLT=1 & JS=PREG << 4 Mbit/s and 16 Mbit/s only >>	FPRPT=1; FPBLT=FPDLT=0 << Stop transmitting idles by forcing the transmit FSM to TS=PRPT. >>
JU0	1138	**TPHMRW=E** & PS_STATUS.indication(Link_status=Not_asserted) & JS=PHMRTU << C-Port failed to detect link activation. >>	JS=BP << Open Error - Trade-up failure. >>
JMPA	1039	**TPIRD=E** & FPJC=0 & SDAC_RC=0000 & JS=PDAC	JS=PJCI; FPINSLE=0; FPJC=FPOP=1; **If** SPD=0001 then TPPD=R; TXI_INS_RSP_PDU(DTR_RSP=0000); **If** FPECO=1 then (FPER=1; TPER=R) << Station accepted by C-Port. >>
	1038	**TPIRD=E** & FPJC=0 & SDAC_RC=8020 & JS=PDAC	FPBPW=1; FPEFS=0; TXI_INS_RSP_PDU(DTR_RSP=8020) << Station rejected by C-Port. >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JMPB	1047	**TPIRD=**E & FPJC=1 & JS=PDAC << Hard Error Recovery. >>	JS=PJCI; FPOP=1; FPINSLE=0; **If** SPD=0001 then TPPD=R; TXI_INS_RSP_PDU(DTR_RSP=0000)
	1076	**TPIRD=E** & JS=PJCI	**If** SPD=0001 then TPPD=R; TXI_INS_RSP_PDU(DTR_RSP=0000)
JLK	1024	**TPLMTR=E** & FPJC=0 & JS=PLT <<End of TXI Join LMT - Test Failed. >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FPRPT=1; SUA=0
JL0	1035	**TPLMTR=E** & FPJC=1 & JS=PLT	JS=BP
JP0	1129	**TPPD=E** & FPINSLE=0 & FPMR<2 & JS=PJCI << Station has approval to insert and C-Port supports phantom drive detection, but has failed to provide Phantom in allotted time. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Phantom not detected. >>
JPW	1147	TPPD=E & FPINSLE=0 & FPMR>1 & JS=PJCI << Station has approval to insert, but has failed to provide Phantom in allotted time. >> << High Media Rate when phantom is supported. >>	JS=PRAW; FPOP=0; CPRAT=n9; TPRAP=R; TXI_RMV_ALRT << Expected Phantom presence is not detected. Attempt to notify Station that the C-Port is returning to Bypass. >>
	1088	**TPQP=E** & CPRQ=1 & JS=PRQ << Registration Query Protocol. >>	TPRQD=R; QUE_REG_QRY; CPRQ=0
	1087	**TPQP=E** & CPRQ>1 & JS=PRQ << Registration Query Protocol. >>	TPQP=R; QUE_REG_QRY; CPRQ=(CPRQ-1)
JP0	1146	**TPPLD=E** & FPPLD=1 & FPMR<2 & JS=PJCI << 4 Mbit/s and 16 Mbit/s only >>	JS=BP << Expected Phantom loss is not detected, thus return to the bypass state. >>
JPW	1130	**TPPLD=E** & FPPLD=1 & FPMR>1 & JS=PJCI << High Media Rate only >>	JS=PRAW; FPOP=0; CPRAT=n9; TPRAP=R; TXI_RMV_ALRT << Expected Phantom loss or LMTN MAC frame is not detected. Attempt to notify Station that the C-Port is returning to Bypass. >>
	1127	**TPRAP=E** & CPRAT<>0 & JS=PRAW << Transmission of Remove Alert MAC Frame has not been completed. >> << High Media Rate only >>	CPRAT=(CPRAT-1); TPRAP=R; TXI_RMV_ALRT << Retransmit Remove Alert MAC Frame. >>
JW0	1128	**TPRAP=E** & CPRAT=0 & JS=PRAW << Transmission of Remove Alert MAC Frame has been completed. >> << High Media Rate only >>	JS=BP << Enter the Bypass state for the reason that started timer TPRAP. >>

Table 9.3-1—C-Port Join Port Operation Table for The TKP or TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
JM0	1048	**TPRHB=E** & FPHBA=1 & JS=PDAC << Heart Beat fails prior to join complete, or Heart Beat fails during Hard Error Recovery. >>	JS=BP
JRQ	1086	**TPRQD=E** & JS=PRQ << Registration Query Protocol. >>	JS=PJCP; FINS=FJR=FPJC=1
JNK	1016	**TRP=E** & MS=TRP & JS=PANNC << Ring Purge failed. >> << 4 Mbit/s and 16 Mbit/s only >>	JS=PREG; MS=*x*; TS=PRPT; Set_initial_conditions; FIPTKPP=0; FPRPT=1; SUA=0; FA(monitor)=0 << C-Port enters Registration as if the Station had not asserted its Phantom signal. >>
	1150	**TPTUAD=E** & JS=PHMRTU << Assured Delivery timer has expired, so C-Port can now change Media Rate. >>	Flush_transmit_queues; PS_CONTROL.request (Initialize, Media_rate=2) << Switch to 100 Mbit/s and wait for Link Status. >>

9.3.4.2 C-Port Transmit Port Operation Table for the TXI Access Protocol

Table 9.3-2—C-Port Transmit Port Operation Table for the TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TEDA	1203	**CPBTX>PPV(MAX_TX)** & FPASO=0 & TS=PTXD << Maximum frame size has been exceeded. >>	[TS=PTXN; TX_AB; FPTAS=FPTI=1 (optional-unk)] << Transmit abort sequence. >>
TEDF	1215	**CPBTX>PPV(MAX_TX)** & FPMR>1 & FPASO=1 & TS=PTXD << Maximum frame size has been exceeded. >> << High Media Rate only >>	[TS=PTXN; TX_INV_FCS; TX_EFS(E=1); FPTAS=FPTI=1 (optional-unk)] << The frame is aborted by transmit of invalid FCS and E=1. >>
TEDB	1210	**CPBTX>PPV(MAX_TX)** & FPMR<2 & FPASO=1 & TS=PTXD << Maximum frame size has been exceeded. >> << 4 Mbit/s and 16 Mbit/s only >>	[TS=PTXN; FPTAS=FPTI=1; TX_INV_FCS; TX_EFS(I=0, E=1) (optional-unk)] << The frame is aborted by transmit of invalid FCS, I=0 and E=1. >>
TEDH	1209	**DTU_UNITDATA-STATUS.request(Fail)** & FPMR<2 & FPTX_LTH=0 & TS=PTXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a cut-through frame is being transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=PTXN; TX_AB; FPTAS=FPTI=1 << The frame is aborted because the cut-through frame has completed with a Fail status. >>
TEDE	1216	**DTU_UNITDATA-STATUS.request(Fail)** & FPMR>1 & FPTX_LTH=0 & TS=PTXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a cut-through frame is being transmitted. >> << High Media Rate only >>	TS=PTXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FPTAS=FPTI=1 << Because the cut-through frame has completed with a Fail status, the frame is aborted as follows. • If FPASO=0, then the frame is aborted using an Abort Sequence. • If FPASO=1, then the frame is aborted using an invalid FCS and E=1. >>
	1200	**EOB** & TS=PTXD <<Occurs once per byte transmission. >>	[CPBTX=(CPBTX+1) (optional-unk)] << Byte count maintained for MAX_TX. >>
TEDC	1204	**EOD** & TS=PTXD << End of frame transmission. >>	TS=PTXN; FPEFS=FPTI=1; TX_FCS; If FPMR<2 then TX_EFS(I=E=0); If FPMR>1 then TX_EFS(E=0)
TFDA	1207	**FPRPT=0** & FPMR<2 & TS=PRPT << 4 Mbit/s and 16 Mbit/s only >>	TS=PTXN; FPTI=1; **If** FPOP=1 then FPTXC=1

Table 9.3-2—C-Port Transmit Port Operation Table for the TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TFDB	1213	**FPRPT=0** & FPMR>1 & TS=PRPT << High Media Rate only >>	TS=PTXN; FPTI=1
TDFA	1206	**FPRPT=1** & FPMR<2 & TS=PTXN << 4 Mbit/s and 16 Mbit/s only >>	TS=PRPT; FPTI=FPTXC=0
TDFB	1214	**FPRPT=1** & FPMR>1 & FPRPTO=1 & TS=PTXN << Port supporting a Repeat Path. >> << High Media Rate only >>	TS=PRPT; FPTI=0
	1211	**FR(DA=any_recognized_address)** & FPACO=1 & TS=PRPT	Set A=1
	1212	**FR_COPIED(DA=any_recognized_address)** & FPACO=1 & TS=PRPT	Set C=1
TDEA	1202	**PDU_QUEUED** & FPOP=1 & FPRPT=0 & TS=PTXN << Queued frames are sent only when FPOP=1. >>	TS=PTXD; FPBPF=FPTI=0; **If** FR_LTH<=PPV(MAX_TX) then FPTX_LTH=1; **If** FR_LTH=UNK then FPTX_LTH=0; **If** FPMR=0 then CPBTX=9; **If** FPMR=1 then CPBTX=D; **If** FPMR=2 then CPBTX=14; **If** FPMR=3 then CPBTX=18; TX_SFS(P=*x*; R=0) << The frame length of the queued frame is either unknown or a value less than PPV(MAX_TX). >>
TEDH	1205	**PORT_ERR(Correctable)** & FPMR<2 & TS=PTXD << C-Port could not complete transmission of frame being transmitted - abort frame. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=PTXN; TX_AB; FPTAS=FPTI=1 <<Transmit Abort sequence. >>
TEDE	1218	**PORT_ERR(Correctable)** & FPMR>1 & TS=PTXD << C-Port could not complete transmission of frame being transmitted - abort frame. >> << High Media Rate only >>	TS=PTXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FPTAS=FPTI=1 <<Transmit Abort sequence. >>
TEDD	1208	**PORT_ERR(not_correctable)** & FPMR<2 & TS=PTXD << C-Port could not complete transmission of frame being transmitted. >> << 4 Mbit/s and 16 Mbit/s only >>	TS=PTXN; [TX_AB (optional)]; FPBPF=FPTI=1 << Transmit Abort sequence – optional. >>

Table 9.3-2—C-Port Transmit Port Operation Table for the TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
TEDG	1217	**PORT_ERR(not_correctable)** & FPMR>1 & TS=PTXD << C-Port could not complete transmission of frame being transmitted. >> << High Media Rate only >>	TS=PTXN; **If** FPASO=0 then TX_AB; **If** FPASO=1 then (TX_INV_FCS; TX_EFS(E=1)); FPBPF=FPTI=1 << The frame is aborted and the C-Port is forced to enter the Bypass state. >>
TDEB	1201	**TXI_REQ** & FPRPT=0 & TS=PTXN	TS=PTXD; FPBPF=FPTI=0; FPTX_LTH=1; **If** FPMR=0 then CPBTX=9; **If** FPMR=1 then CPBTX=D; **If** FPMR=2 then CPBTX=14; **If** FPMR=3 then CPBTX=18; TX_SFS(P=*x*; R=0) << Frame length for a frame in the TXI queue is always known. >>

9.3.4.3 C-Port Monitor Port Operation Table for the TXI Access Protocol

Table 9.3-3—C-Port Monitor Port Operation Table for the TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1406	**FPINSD=0** & FPINSLE=1 & FPBNT=0 & JS=PJCI & MS=PIT << Start-up of LMT support. >>	FPBNT=1; FPPLD=0
MJL	1401	**FR_BN(SA=SUA)** & FPJC=1 & MS=POPT << Attached station in Beacon Transmit, execute Internal Test. >>	MS=PIT; FPHBA=FPOP=0; TPPLD=R; FPPLD=1; INTERNAL_PTEST << Start protocol loss detect function (TPPLD=R). >>
MKL	1404	**FR_BN(SA=SUA)** & MS=PTBN << Attached station Beacon received, execute Internal Test. >>	MS=PIT; TPPLD=R; FPPLD=1; INTERNAL_PTEST << Start protocol loss detect function (TPPLD=R). >>
MLJ	1405	**FR_INS_REQ(SA=SUA)** & MS=PIT	MS=POPT
	1407	**FR_LMTN(DA=broadcast)** & FPINSLE=0 & MS=PIT & JS=PJCI << The C-Port will establish the repeat path after reception of the first FR_LMTN, if not already established. >>	**If** FPRPTO=0 then TXI_LMTN_PDU; FPBNT=1; FPPLD=0 << Return this frame only if PMAC repeat path is being used. >>
	1408	**FR_SHB(SA=SUA)** & FPHBA=1 << Heart Beat has been detected. >>	TPRHB=R << Restart Heart Beat Detection process. >>

Table 9.3-3—C-Port Monitor Port Operation Table for the TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
MKL	1403	**TPIT=E** & MS=PTBN	MS=PIT; TPPLD=R; FPPLD=1; INTERNAL_PTEST << Start protocol loss detect function (TPPLD=R). >>
	1409	**TPQHB=E** & FPHBA=1	TPQHB=R; TXI_PHB_PDU << Heart Beat Transmission uses TXI since this function operates prior to FPOP=1. >>
	1402	**TPQP=E** & MS=PTBN	TPQP=R; **If** FPSL=1 then TXI_BN_PDU(BN_TYPE=2); **If** FPSL=0 then TXI_BN_PDU(BN_TYPE=5)
MJK	1400	**TPRHB=E** & FPHBA=1 & FPJC=1 & MS=POPT << Loss of TXI Access protocol Heart Beat. >>	MS=PTBN; FPHBA=FPOP=0; TPIT=R; TPQP=R; **If** FPSL=1 then TXI_BN_PDU(BN_TYPE=2); **If** FPSL=0 then TXI_BN_PDU(BN_TYPE=5)

9.3.4.4 C-Port Error Handling Port Operation Table for the TXI Access Protocol

Table 9.3-4—C-Port Error Handling Port Operation Table for the TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1600	**Burst5_error_event** & CPBE<FF & FPJC=1 & FPER=1 & MS=POPT << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	CPBE=(CPBE+1)
	1601	**Burst5_error_event** & FPJC=1 & FPER=0 & MS=POPT << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	FPER=1; TPER=R; CPBE=(CPBE+1)
	1614	**FPTAS=1** & TS=PTXN & CPABE<FF & FPJC=1 & FPER=1 & MS=POPT << Transmitter has released an Abort Sequence. >>	FPTAS=0; CPABE=(CPABE+1)
	1617	**FPTAS=1** & TS=PTXN & FPJC=1 & FPER=0 & MS=POPT << Transmitter has released an Abort Sequence. >>	FPTAS=0; FPER=1; TPER=R; CPABE=(CPABE+1)
	1604	**FR_NOT_COPIED** & CPRCE<FF & FPJC=1 & FPER=1 & MS=POPT	CPRCE=(CPRCE+1)
	1605	**FR_NOT_COPIED** & FPJC=1 & FPER=0 & MS=POPT	FPER=1; TPER=R; CPRCE=(CPRCE+1)
	1606	**FR_WITH_ERR(E=0)** & CPLE<FF & FPJC=1 & FPER=1 & MS=POPT	CPLE=(CPLE+1)
	1607	**FR_WITH_ERR(E=0)** & FPJC=1 & FPER=0 & MS=POPT	FPER=1; TPER=R; CPLE=(CPLE+1)
	1608	**INTERNAL_ERR(correctable)** & CPIE<FF & FPJC=1 & FPER=1 & MS=POPT	CPIE=(CPIE+1)
	1609	**INTERNAL_ERR(correctable)** & FPJC=1 & FPER=0 & MS=POPT	FPER=1; TPER=R; CPIE=(CPIE+1)
	1610	**PM_STATUS.indication (Signal_detection=signal_acquired)** & FPSLD=1 << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	FPSL=FPSLD=0
	1611	**PM_STATUS.indication (Signal_detection=signal_loss)** & FPSLD=0 << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	FPSLD=1; TPSL=R
	1613	**PS_STATUS.indication(Frequency_error)** & CPFE<FF & FPJC=1 & FPER=1 & MS=POPT << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	CPFE=(CPFE+1)
	1612	**PS_STATUS.indication(Frequency_error)** & FPJC=1 & FPER=0 & MS=POPT << Event occurs only at 4 Mbit/s and 16 Mbit/s. >>	FPER=1; TPER=R; CPFE=(CPFE+1)
	1618	**TPER=E** & FPJC=1 & FPECO=1	TPER=R
	1616	**TPSL=E** & FPSLD=1	FPSL=1

9.3.4.5 C-Port Interface Signals Port Operation Table for the TXI Access Protocol

Table 9.3-5—C-Port Interface Signals Port Operation Table for the TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1819	**DTU_UNITDATA-STATUS.request(Fail)** & FPTX_LTH=1 & TS=PTXD << Transmit FSM is currently transmitting a previously queued frame. This is an indication that frame cut-through is terminating with an error. >>	DISCARD_QUEUED_PDU << The PDU discarded is the frame that was the subject of the previous DTU_UNITDATA.request. >>
	1820	**DTU_UNITDATA-STATUS.request(Fail)** & TS=PTXN << Transmit FSM is currently in the normal state. This may occur between frame transmissions. >>	DISCARD_QUEUED_PDU << The PDU discarded is the frame that was the subject of the previous DTU_UNITDATA.request. >>
	1818	**DTU_UNITDATA-STATUS.request(OK)** & FPTX_LTH=0 & TS=PTXD << Transmit FSM currently transmitting a frame of unknown length. This is an indication that a cut-through frame is being transmitted. >>	FPTX_LTH=1 << The cut-through frame has completed with an OK status, the frame length is now known. >>
	1800	**DTU_UNITDATA.request** & FPJC=1 & FPOP=1 & FR_LTH<=PPV(MAX_TX) << A frame of known length is passed to the C-Port. >>	QUE_PDU
	1801	**DTU_UNITDATA.request** & FPJC=1 & FPOP=1 & FR_LTH=UNK << A frame cut-through operation has started. The frame length is currently not known. The data is optionally placed into the transmit queue and made available for transmission (QUE_PDU action allows the PDU_QUEUED event to occur). >>	[QUE_PDU (optional-i)]
	1802	**FPTI=0**	{PM_CONTROL.request (Transmit_mode=No_fill)} ***or*** {PS_CONTROL.request (Transmit_mode=No_fill)} << An implementation shall take one of these two actions. >>
	1803	**FPTI=1**	{PM_CONTROL.request (Transmit_mode=Fill)} ***or*** {PS_CONTROL.request (Transmit_mode=Fill)} << An implementation shall take one of these two actions. >>

Table 9.3-5—C-Port Interface Signals Port Operation Table for the TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	1804	FPTXC=0 << 4 Mbit/s and 16 Mbit/s only >>	PS_CONTROL.request (Crystal_transmit=Not_asserted)
	1805	**FPTXC=1** << Note: 1) When operating at 4 Mbit/s or 16 Mbit/s, Crystal Transmit is controlled by the Join and Monitor Port Operation Tables and, may or may not be asserted. 2) When operating at the High Media Rate, Crystal Transmit shall always be asserted. >>	PS_CONTROL.request (Crystal_transmit=Asserted)
	1806	**FR** & FPFCO=0 & FPJC=1 & FPOP=1 << Indicates that a complete frame is passed to the DTU. >>	DTU_UNITDATA.indication; DTU_UNITDATA-STATUS.indication (OK)
	1816	**FR** & FPFCO=1 & FPOP=1 & FPJC=1 << Indicates that frame cut-through has completed. >>	DTU_UNITDATA-STATUS.indication (OK)
	1814	**FR_FC** & FPFCO=1 & FPJC=1 & FPOP=1 << Indicates that Frame cut-through has started. >>	DTU_UNITDATA.indication
	1808	**FR_MAC(DA<>any_recognized_address & SC<>0)** & FPJC=1 & FPOP=1	MRI_UNITDATA.indication
	1807	**FR_MAC(DC<>0 & DC<>3 & SC=0)** & FPJC=1 & FPOP=1	MRI_UNITDATA.indication
	1815	**FR_RSP_PDU(SC=RS)**	MGT_UNITDATA.indication
	1817	**FR_WITH_ERR** & FPFCO=1 & FPOP=1 & FPJC=1 << Indicates that frame cut-through has failed due to a frame error. >>	DTU_UNITDATA-STATUS.indication (Fail)
	1809	**MRI_UNITDATA.request** & FPJC=1 & FPOP=1 & FR_LTH<=PPV(MAX_TX)	QUE_PDU
	1810	**MRI_UNITDATA.request** & FPJC=1 & FPOP=1 & FR_LTH=UNK	[QUE_PDU (optional-i)]
	1812	**PM_STATUS.indication(Insert=Detected)** << Phantom signaling indicated inserted. Not at 1000 Mbit/s. >>	FPINSD=FPINSLE=1
	1813	**PM_STATUS.indication(Insert=Not_detected)** << Phantom signaling indicated de-inserted. Not at 1000 Mbit/s. >>	FPINSD=0 << Indicates Station has been removed from the C-Port's Lobe. >>
	1811	**TPER=E** & FPOP=1 & ERR_PCNTR<>0	**If** FPECO=0 then FPER=0; MRI_UNITDATA.indication (RPT_ERR_PDU);SET_ERR_PCNTR=0

9.3.4.6 C-Port Miscellaneous Frame Handling Port Operation Table for the TXI Access Protocol

Table 9.3-6—C-Port Miscellaneous Frame Handling Port Operation Table for the TXI Access Protocol

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	2000	**FR_CHG_PARM**	[SET APPR_PARMS (optional-x)]
	2001	**FR_CHG_PARM**(CORR_NOT_PRESENT)	[TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=0001) (optional-x)]
	2002	**FR_CHG_PARM**(CORR_PRESENT)	[TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=0001) (optional-x)]
	2003	**FR_INIT**	[SET APPR_PARMS (optional-x)]
	2004	**FR_INIT**(CORR_NOT_PRESENT)	[TXI_RSP_PDU(DC=RPS; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=0001) (optional-x)]
	2005	**FR_INIT**(CORR_PRESENT)	[TXI_RSP_PDU(DC=RPS; SC=RS; CORR=RCV_CORR; RSP_TYPE=0001) (optional-x)]
	2006	**FR_MAC_INV**(ERR_COND=LONG_MAC & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8009)
	2007	**FR_MAC_INV**(ERR_COND=LONG_MAC & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8009)
	2008	**FR_MAC_INV**(ERR_COND=SC_INVALID & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8004)
	2009	**FR_MAC_INV**(ERR_COND=SC_INVALID & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8004)
	2010	**FR_MAC_INV**(ERR_COND=SHORT_MAC & SC_NOT_PRESENT)	[TXI_RSP_PDU(DC<>RS; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8001) (optional-x)]
	2011	**FR_MAC_INV**(ERR_COND=SHORT_MAC & SC_PRESENT & SC<>RS)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_ (optional-x)]; RSP_TYPE=8001)
	2012	**FR_MAC_INV**(ERR_COND=SV_LTH_ERR & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8005)
	2013	**FR_MAC_INV**(ERR_COND=SV_LTH_ERR & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8005)
	2014	**FR_MAC_INV**(ERR_COND=SV_MISSING & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8007)

Table 9.3-6—C-Port Miscellaneous Frame Handling Port Operation Table for the TXI Access Protocol *(continued)*

S/T	REF	EVENT / EVENT & CONDITIONS	ACTIONS / OUTPUTS
	2015	**FR_MAC_INV**(ERR_COND=SV_MISSING & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8007)
	2016	**FR_MAC_INV**(ERR_COND=SV_UNK & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8008)
	2017	**FR_MAC_INV**(ERR_COND=SV_UNK & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8008)
	2018	**FR_MAC_INV**(ERR_COND=VI_LTH_ERR & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8002)
	2019	**FR_MAC_INV**(ERR_COND=VI_LTH_ERR & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8002)
	2020	**FR_MAC_INV**(ERR_COND=VI_UNK & SC<>RS & CORR_NOT_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; [CORR=UNK_VALUE (optional-x)]; RSP_TYPE=8003)
	2021	**FR_MAC_INV**(ERR_COND=VI_UNK & SC<>RS & CORR_PRESENT)	TXI_RSP_PDU(DC=RCV_SC; SC=RS; CORR=RCV_CORR; RSP_TYPE=8003)
	2022	**FR_REMOVE**	TXI_RSP_PDU(DC=RCV_SC; SC=RS; RSP_TYPE=800A)
	2024	**FR_RQ_ADDR**	[TXI_RPRT_ADDR_PDU (optional-x)]
	2025	**FR_RQ_ATTACH**	[TXI_RPRT_ATTACH_PDU (optional-x)]
	2026	**FR_RQ_STATE**	[TXI_RPRT_STATE_PDU (optional-x)]

9.3.4.7 Precise Specification of Terms

This subclause provides precise specification of terms used by the C-Port's Operation Tables. These specifications are for the *Event/Conditions* and Action/Output columns.

9.3.4.7.1 Precise Specification of Events/Conditions

The following definitions are applied to the terms used for events in the Finite State Machines and C-Port Operation Tables.

Unless otherwise specified, the following terms and operations are defined:	
Expression	**Meaning of expression**
{flag}=0	The specified flag is set to zero (false).
{flag}=1	The specified flag is set to one (true).
{term1} < {term2}	Term 1 is less than term 2.
{term1} <= {term2}	Term 1 is less than or equal to term 2.

Unless otherwise specified, the following terms and operations are defined:	
Expression	**Meaning of expression**
{term1} <> {term2}	Term 1 is not equal to term 2.
{term1} = {term2}	Term 1 is equal to term 2.
{term1} > {term2}	Term 1 is greater than term 2.
{term1} >= {term2}	Term 1 is greater than or equal to term 2.
{timer}=E	The specified timer has expired.

The following additional items of relevance are used in the tables.

- Values are in hexadecimal notation unless otherwise indicated.
- & means "and."
- | means "or."

Precise Specification of Events/Conditions	
Event/Condition Term	**Meaning of this term**
A=0	Both A-bits in the received frame's FS field (bits 0 and 4) are 0.
AND(x,y)	Bit-wise Logical AND function of binary objects x and y.
AP_MASK	Option Mask for Access Protocol. Bit significant mask used by the C-Port. One bit is defined for each access protocol supported.
AP_REQ=value	Access Protocol Request subvector is received with the specified value.
Burst5_error_event	A PM_STATUS.indication(Burst5_error) has occurred. The conditions under which a Burst5_error is excluded are not uniquely specified by this standard (see 10.6.2.2).
C=0	Both C-bits in the received frame's FS field (bits 1 and 5) are 0.
Connect.PMAC	The PMAC receives this command from local management to start the process of joining the network.
DA<>any_recognized_address	The DA of the received frame does not match any of the C-Port's addresses being a) any of the C-Port's individual addresses, or b) any of the C-Port's group addresses, or c) any of the C-Port's functional addresses, or d) any of the broadcast addresses defined in 3.2.4.1.
DA=any_recognized_address	The DA of the received frame matches any of the C-Port's addresses being a) one of the C-Port's individual address, or b) one of the C-Port's group addresses, or c) one of the C-Port's functional addresses, or d) one of the broadcast addresses defined in 3.2.4.1.

Precise Specification of Events/Conditions	
Event/Condition Term	**Meaning of this term**
DA=MA	The DA of the received frame is equal to the individual address of the C-Port. If the C-Port's individual address is a Universally administered address, then all 48 bits must match. If the C-Port's individual address is a locally administrated address, then either a hierarchical address match or a 48-bit address match is allowed.
DA=Non_broadcast	The received frame was not sent to a broadcast address, but was otherwise addressed to the C-Port.
DC<>0	Destination Class is not MAC.
Disconnect.PMAC	The request from local management to close the C-Port.
DTU_DAC.response(RC)	Response to the C-Port's request (DTU_DAC.request). RC uses the same values as the DTR_RSP subvector defined in Table 10-6.
DTU_UNITDATA.request	The DTU requests a frame to be transmitted.
DTU_UNITDATA-STATUS.request (Status_Code)	Frame status is reported by the DTU to the PMAC. The Status_Code may be one of the following: 1) OK: The frame has been successfully transferred to the PMAC without error. 2) Fail: Transfer of the frame to the PMAC has failed because of a frame error.
EOB	End of Byte: The last bit of an octet has been transmitted, excluding octets representing SD, AC, FCS, ED, FS, and IFG.
EOD	End of Data: The last octet of the Information field has been transmitted.
ERR_CNTR<>0	Any error counter is nonzero.
FR	A frame that meets the criteria specified in 4.3.2 (4 Mbit/s or 16 Mbit/s only) or 9.1.1.6 (High Media Rate only) has been received.
FR(criteria)	A frame that meets the specified criteria and the criteria specified in 4.3.2 (4 Mbit/s or 16 Mbit/s only) or 9.1.1.6 (High Media Rate only) has been received.
FR_AC	A bit sequence that indicates 1) A frame's SD and AC fields at 4 Mbit/s and 16 Mbit/s have been received as specified in 4.3.2. 2) A frame's SSD and AC fields at the High Media Rate have been received as specified in 9.1.1.6.
FR_AMP	A verified Active Monitor Present frame (see 10.3.6) is received.
FR_BN(criteria)	A verified Beacon Frame (see 10.3.6) that meets the specified criteria is received.
FR_CHG_PARM(criteria)	A verified Change Parameters MAC frame (see 10.3.6) that meets the specified criteria is received.
FR_COPIED(criteria)	The PMAC successfully copied the received frame that meets the specified criteria.
FR_CT << 4 Mbit/s and 16 Mbit/s only >>	A Claim Token MAC frame (see 3.3.5.2) is received.
FR_FC	A frame has been received through the FC field (see 9.1.1.6).

Precise Specification of Events/Conditions	
Event/Condition Term	**Meaning of this term**
FR_INIT	A verified Initialize Station MAC frame (see 10.3.6) is received.
FR_INS_REQ(criteria)	A verified Insert Request MAC frame (see 10.3.6) that meets the specified criteria is received.
FR_LLC(criteria)	An LLC frame that meets the specified criteria is received and the criteria specified in 4.3.2.
FR_LMTN(DA=broadcast) << Only if Station is using LMT defined by 9.1.6.2 >>	A verified Lobe Media Test Notification MAC Frame addressed to the broadcast address (see 12.3.1) is received.
FR_LTH	The length of the frame to be transmitted. The value for the frame length includes all of the frame format fields beginning with the starting delimiter (SD) and including the interframe gap (IFG).
FR_LTH<=PPV(MAX_TX)	The length of the frame to be transmitted is less than or equal to the C-Port's maximum allowed frame length.
FR_LTH=UNK	The length of the frame to be transmitted is unknown.
FR_MAC(criteria).	A valid MAC frame that meets the specified criteria is received and the criteria specified in 10.3.6.
FR_MAC_INV(reason)	FR_MAC_INV(reason). A valid (4.3.2) MAC frame that fails verification (see 10.3.6.5) for the reason specified is received.
FR_NOT_COPIED	The C-Port recognizes a valid frame to be copied, but is unable to copy the frame.
FR_REG_REQ(criteria)	A verified Registration Request MAC frame (see 10.3.6) that meets the specified criteria is received.
FR_REMOVE(criteria)	A verified Remove MAC Frame (see 10.3.6) that meets the specified criteria is received.
FR_REQ_ADDR	A verified Request Address MAC frame (see 10.3.6) is received.
FR_RMV_ALRT (VC=30 & SA=SUA) << High Media Rate only >>	A verified Remove Alert MAC frame (see 12.3.1) is received.
FR_RP << 4 Mbit/s and 16 Mbit/s only >>	A verified Ring Purge MAC frame (see 10.3.6) is received.
FR_RQ_ATTACH	A verified Request Attachment MAC frame (see 10.3.6) is received.
FR_RQ_STATE	A verified Request Station State MAC frame (see 10.3.6) is received.
FR_RSP_PDU(criteria)	A verified Response MAC frame (see 10.3.6) which meets the specified criteria is received.
FR_SHB(criteria)	A verified SHB MAC frame (see 10.3.6) that meets the specified criteria is received.
FR_SMP	A verified SMP MAC frame (see 10.3.6) is received.

Precise Specification of Events/Conditions	
Event/Condition Term	**Meaning of this term**
FR_TEST(DA=FA(TEST)) << Only if Station is using LMT defined by 9.1.6.2 >>	A verified Lobe Media Test MAC Frame addressed to the TEST functional address (see 12.3.1) is received.
FR_WITH_ERR	A frame is received with errors (see 9.1.1.6).
INTERNAL_ERR	Any internal error occurred that prevented the C-Port from following the established protocol (i.e., parity error, etc.).
Internal_Test_Failure	The C-Port failed during internal testing.
JS=state	The Join FSM is in the specified state.
MRI_UNITDATA.request	The Management Routing Interface requests a frame be transmitted.
MS=state	The Monitor FSM is in the specified state.
PDU_QUEUED(criteria)	A frame that meets the specified criteria is queued for transmission.
PM_STATUS.indication (Insert=Detected) << Does not occur at 1000 Mbit/s. >>	The PHY indicates an insert request is received via the phantom-signaling channel (see 9.7.1.2.1 for 4 Mbit/s and 16 Mbit/s, or 9.7.2.2.1 for 100 Mbit/s).
PM_STATUS.indication (Insert=Not_detected) << Does not occur at 1000 Mbit/s. >>	The PHY indicates the absence of an insert request on the phantom-signaling channel (see 9.7.1.2.1 for 4 Mbit/s and 16 Mbit/s, or 9.7.2.2.1 for 100 Mbit/s).
PM_STATUS.indication (Signal_detection=signal_acquired)	The PHY indicates valid receiver signal (see 5.1.4.1).
PM_STATUS.indication (Signal_detection=signal_loss)	The PHY indicates loss of valid receiver signal (see 5.1.4.1).
PORT_ERR	Any internal C-Port condition that prevents the successful completion of the PDU transmit operation.
PS_STATUS.indication (Frequency_error)	The C-Port indicates the frequency of the received data is out of tolerance (see 5.1.2.3).
PS_STATUS.indication(Burst4_error)	The C-Port indicates the received data contains a Burst4_error (see 5.1.2.3).
PS_STATUS.indication(Burst5_error)	The C-Port indicates the received data contains a Burst5_error (see 5.1.2.3).
PS_STATUS.indication (Link_status=Asserted) << Occurs only at the High Media Rate >>	The High Media Rate PHY indicates that the link is active (see 9.8.1.1.3 for 100 Mbit/s and 9.8.2.1.3 for 1000 Mbit/s).
PS_STATUS.indication (Link_status=Not_asserted) << Occurs only at the High Media Rate >>	The High Media Rate PHY indicates that the link is inactive (see 9.8.1.1.3 for 100 Mbit/s and 9.8.2.1.3 for 1000 Mbit/s).
SA<>MA	The source address (SA) of the received frame is not equal to the individual address of the C-Port.
SA<>SUA	The source address (SA) of the received frame is not equal to the address stored as the upstream neighbor's address (SUA).

Precise Specification of Events/Conditions	
Event/Condition Term	**Meaning of this term**
SA=MA	The source address (SA) of the received frame is equal to the individual address of the C-Port.
SA=SUA	The source address (SA) of the received frame is equal to the address stored as the upstream neighbor's address (SUA).
SC<>0	Source Class is not MAC.
SDAC_RC=value	The stored duplicate address check return code is equal to the designated value.
TK_AC << 4 Mbit/s and 16 Mbit/s only >>	A Token is received that meets the criteria specified in 4.3.1.
TS=state	The Transmit FSM is in the specified state.
TXI_REQ	A frame is to be transmitted immediately.
UNA	The Upstream Neighbor's Address subvector in the received frame.
UNA<>MA	The Upstream Neighbor's Address (UNA) in the received frame is not equal to the C-Port's individual address.
UNA<>SUA	The Upstream Neighbor's Address in the received frame is not equal to the Stored Upstream Address.
UNA=MA	The Upstream Neighbor's Address (UNA) in the received frame is equal to the C-Port's individual address.
UNA=SUA	The Upstream Neighbor's Address is equal to the Stored Upstream Address.

9.3.4.7.2 Precise Specification of Actions

The following definitions are applied to the terms used for Actions in the Finite State Machines and C-Port Operation Tables. Actions are separated by a semicolon (**;**).

Unless otherwise specified, the following terms and operations are defined:	
Expression	**Meaning of expression**
{counter}=({counter}+1)	Increment the specified counter by one.
{counter}=({counter}-1)	Decrement the specified counter by one.
{counter}=value	Set the specified counter to the specified value.
{flag}=0	Set the value of the specified flag to zero (false).
{flag}=1	Set the value of the specified flag to one (true).
{timer}=R	The specified timer is set to its initial value and started.
variable = value	Set the variable to the specified value.

The following additional items of relevance are used in the tables:

— Values are in hexadecimal notation unless otherwise indicated.
— **;** means “and.”

Precise Specification of Actions/Outputs	
Action/Output Term:	**Meaning of this term:**
AP_RSP=value	The AP_RSP subvector, in the Registration Response MAC frame being transmitted, takes on the indicated value.
BN_TYPE=value	The value of the beacon type subvector to be transmitted
CORR=UNK_VALUE (optional-x)	The frame received did not contain a correlator subvector (see 3.3.4), thus the value of the correlator subvector to be transmitted is unspecified and the subvector may be omitted. New implementations are recommended not to transmit the correlator subvector when no correlator subvector was received.
DISCARD_QUEUED_PDU	The C-Port removes the frame from the transmit queue that was the subject of the previous DTU_UNITDATA.request.
DTU_DAC.request (starting_address, individual_address_count)	Indication to the DTU entity, requesting a check of the addressing of the connected Station.
DTU_UNITDATA.indication	The frame is indicated to the DTU interface.
DTU_UNITDATA-STATUS.indication (Status_Code)	Frame status is indicated by the PMAC to the DTU. The Status_Code may be one of 1) OK: The frame has been successfully transferred to the DTU without error. 2) Fail: Transfer of the frame to the DTU has failed due to a frame error.
FA(address)=0	Disable the indicated functional address.
FA(address)=1	Enable the indicated functional address.
Flush_transmit_queues	The transmitter is instructed to discard any frames in its transmit queues.
FR_LTH<=PPV(MAX_TX)	The length of the frame to be transmitted is less than or equal to the C-Port’s maximum allowed frame length.
FTI=*x*	The value of FTI is not specified.
INSERT << Does not occur at 1000 Mbit/s. >>	Request the PHY to physically connect the Station to the network (PM_CONTROL.request(Insert_station) in 9.7.1.1.2 for 4 Mbit/s and 16 Mbit/s, or 9.8.1.1.7 for 100 Mbit/s. Not used at 1000 Mbit/s).
INTERNAL_PTEST	Internal C-Port diagnostic testing. Specification of this diagnostic test is beyond the scope of this standard.
JS=state	The Join FSM is changed to the specified state.
MRI_UNITDATA.indication	The frame is indicated to the Management Routing Interface.
MRI_UNITDATA.indication (RPT_ERR_PDU)	A Report Error PDU is indicated to the Management Routing Interface.
MS=state	The Monitor FSM is changed to the specified state.
MS=*x*	The Monitor FSM state is changed to unspecified (not running).

Precise Specification of Actions/Outputs	
Action/Output Term:	**Meaning of this term:**
P	The value of the P-bits in the AC field.
PM_CONTROL.request (Transmit_mode=Fill) << 4 Mbit/s and 16 Mbit/s only >>	The C-Port PMAC requests the PMC stop repeat and start sourcing fill. (See 9.7.1.1.2 for 4 Mbit/s and 16 Mbit/s. Not used at the Higher Media Rate.)
PM_CONTROL.request (Transmit_mode=Repeat) << 4 Mbit/s and 16 Mbit/s only >>	The C-Port PMAC requests the PMC stop sourcing fill and start repeat. (See 9.7.1.2.2 for 4 Mbit/s and 16 Mbit/s. Not used at the Higher Media Rate.)
PS_CONTROL.request (Crystal_transmit=Asserted)	The C-Port PMAC requests Crystal_transmit (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s or 9.8.2.1.4 for 1000 Mbit/s operation).
PS_CONTROL.request (Crystal_transmit=Not_asserted)	The C-Port PMAC removes the Crystal_transmit request (see 5.1.2.4). This signal is not used in the High Media Rate operation.
PS_CONTROL.request (Transmit_mode=Fill)	The C-Port PMAC requests the PSC stop repeat and start sourcing fill (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s or 9.8.2.1.4 for 1000 Mbit/s).
PS_CONTROL.request (Transmit_mode=Repeat)	The C-Port PMAC requests the PSC stop sourcing fill and start repeat (see 5.1.2.4 for 4 Mbit/s and 16 Mbit/s, 9.8.1.1.4 for 100 Mbit/s or 9.8.2.1.4 for 1000 Mbit/s).
QUE_PDU	Queue the PDU for transmission.
QUE_RPRT_ADDR_PDU	Queue a Report Station Address MAC PDU (see 3.3.5.1) for transmission.
QUE_RPRT_ATTACH_PDU	Queue a Report Station Attachment MAC PDU (see 3.3.5.1) for transmission.
QUE_RPRT_ERR_PDU	Queue a Report Error MAC PDU as defined in 3.3.5.1 for transmission.
QUE_RPRT_STATE_PDU	Queue a Report Station State MAC PDU as defined in 3.3.5.1 for transmission.
QUE_RSP_PDU	Queue a Response MAC PDU as defined in 3.3.5.1 for transmission.
S_AP=AP_REQ	Store the value of the Access Protocol Request subvector (AP_REQ) from the received frame.
SDAC_RC=RC	Store the value of the DAC return code from the DTU_DAC.response.
Set A=1	Both A-bits in the FS field shall be set to one as the frame is repeated.
Set C=1	Both C-bits in the FS field shall be set to one as the frame is repeated.
SET_APPR_PARMS	The C-Port its parameters to the values indicated in the received frame.
SET_ERR_PCNTR=0	Set the values for all of the error counters reported in the Report Error MAC frame to zero.
Set_initial_conditions << 4 Mbit/s and 16 Mbit/s only >>	The C-Port PMAC shall set all flags to zero, set all counters to zero, set all stored values to zero, and stop all timers. The states of the Monitor FSM and Transmit FSM are not specified. The PS_CONTROL.request(Medium_rate) and PM_CONTROL.request(Medium_rate) are asserted according to the value of FPMRO (less than 2).

Precise Specification of Actions/Outputs	
Action/Output Term:	**Meaning of this term:**
Set_initial_conditions << High Media Rate only >>	The C-Port PMAC shall set all flags to zero, set all counters to zero, and set all stored values to zero and stop all timers. The Monitor FSM state is not specified. The PHY is assumed to be already initialized at the correct speed.
SIAC=IAC	Store the value of the Individual Address Count subvector from the received frame.
SPD=PD	Store the value of the Phantom subvector (PD) from the received frame.
SUA=SA	Store the value of the source address (SA) from the received frame as the C-Port's upstream neighbor address (SUA).
TEST	The C-Port shall perform a test of its transmit functions, its receive functions, and the medium between the C-Port and the TCU. It is recommended that the data path includes the elastic buffer and the fixed latency buffer (see 5.8). A C-Port shall fail the test if the sustained bit error rate does not meet the criteria specified in Annex P. A C-Port shall only transmit valid frames, tokens, and fill during the test and shall only count errors in frames and tokens.
TS=state	The Transmit FSM is changed to the specified state.
TX_AB	The C-Port shall transmit an abort sequence as follows: • **4 Mbit/s and 16 Mbit/s:** A Starting Delimiter immediately followed by an Ending Delimiter. • **100 Mbit/s:** A frame abort (PS_CONTROL.request(Abort_frame) as specified in 9.8.1.1.4). • **1000 Mbit/s:** A frame abort (PS_CONTROL.request(Abort_frame) as specified in 9.8.2.1.4).
TX_EFS << High Media Rate only >>	The C-Port shall transmit an end-of-frame sequence composed of ET, ESD, and IFG fields. The ET E-bit shall be zero.
TX_EFS(E=1) << High Media Rate only >>	The C-Port shall transmit an end-of-frame sequence composed of ET, ESD, and IFG fields. The E-bit shall be one.
TX_EFS(I=0) << 4 Mbit/s and 16 Mbit/s only >>	The C-Port shall transmit an end-of-frame sequence composed of ED, FS, and IFG fields. The E-, I-, A-, and C-bits shall be zero.
TX_EFS(I=0, E=1) << 4 Mbit/s and 16 Mbit/s only >>	The C-Port shall transmit an end-of-frame sequence composed of ED, FS, and IFG fields. The I-, A-, and C-bits shall be zero. The E-bit shall be one.
TX_FCS	The C-Port shall transmit frame check sequence for the frame as defined in 3.2.7.

Precise Specification of Actions/Outputs	
Action/Output Term:	**Meaning of this term:**
TX_SFS(P=value; R=value)	The C-Port shall transmit the start-of-frame sequence as follows: • **4 Mbit/s and 16 Mbit/s:** A Starting Delimiter followed by the AC field as defined below. • **100 Mbit/s:** A Start Frame(PS_UNITDATA.request(Start_stream_delimiter) - see 9.8.1.1.2) followed by the AC field as defined below. • **1000 Mbit/s:** A Start Frame (PS_UNITDATA.request(Start_stream_delimiter) - see 9.8.2.1.2) followed by the AC field as defined below. The AC field's P (priority) and R (reservation) values shall be as specified, and T=1 and M=0.
TXI_BN_PDU	The C-Port shall transmit a Beacon MAC frame. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event.
TXI_INS_RSP_PDU()	The C-Port shall transmit an Insert Response MAC frame. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event.
TXI_INV_FCS	The C-Port shall transmit an invalid FCS.
TXI_PHB_PDU	The C-Port shall transmit a C-Port Heart Beat MAC frame. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity. This action generates the TXI_REQ event.
TXI_REG_RSP_PDU()	The C-Port shall transmit a Registration Response MAC frame. The frame shall contain all of the required subvectors. The transmission of the frame occurs at the earliest opportunity. This action generates the TXI_REQ event.
TXI_RP_PDU << 4 Mbit/s and 16 Mbit/s only >>	The station shall transmit a Ring Purge MAC frame with the AC fields of P=000, T=1, M=0, R=000. The frame shall contain all of the required subvectors. The transmission of the frame shall occur at the earliest opportunity (after completion of any transmission in progress) and not wait for a token. This action generates the TXI_REQ event.

9.7 C-Port Specific Components and specifications

Replace 9.7.3 with the following:

9.7.3 1000 Mbit/s operation

Operation at 1000 Mbit/s is exactly as specified for 100 Mbit/s operation in 9.7.2 with the following exceptions:

The phantom signaling channel is not specified for 1000 Mbit/s operation over any media type.

The MIC contact specifications are defined in 9.8.2. Figure 9.7-3 below illustrates the position of the repeat path for 1000 Mbit/s operation.

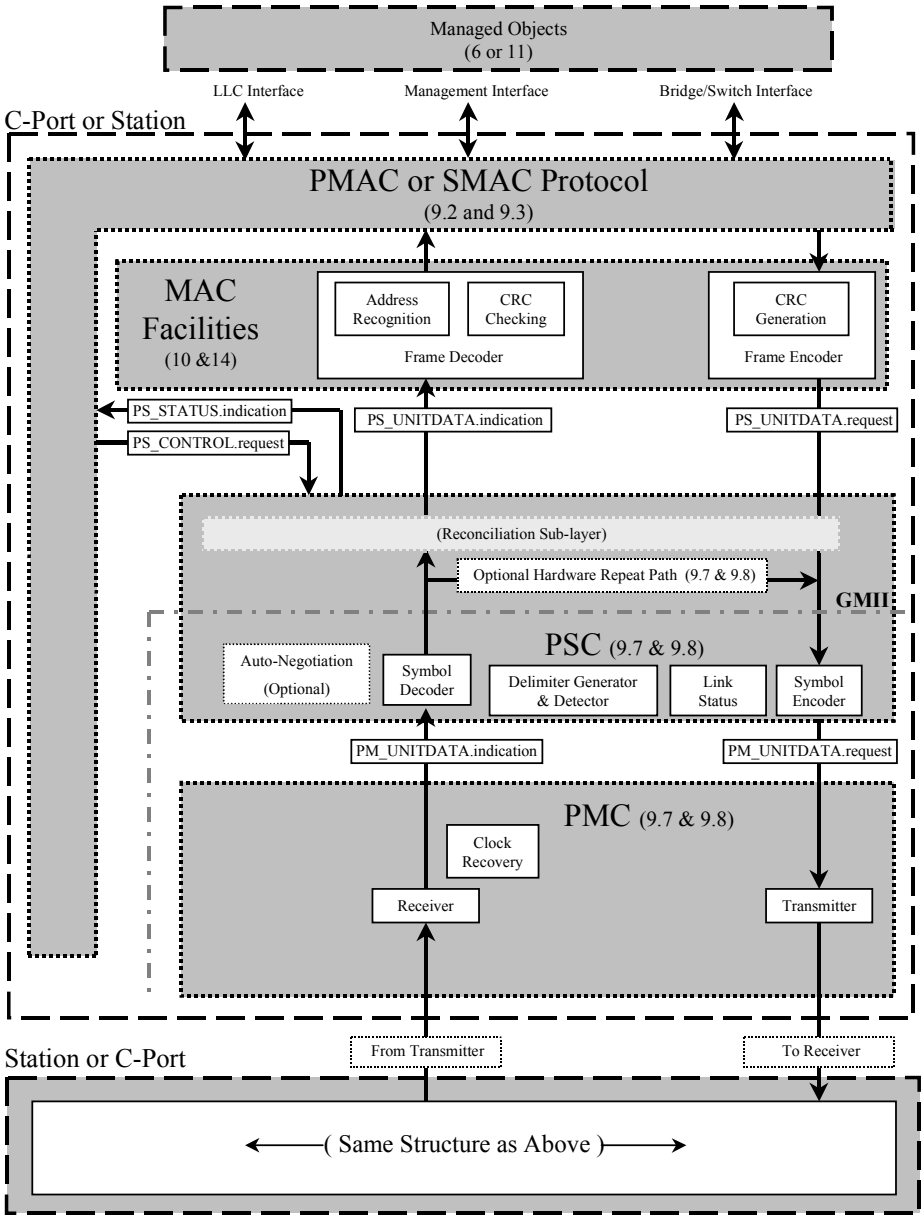


Figure 9.7-3—C-Port Repeat Path: A repeat path shall be supplied to support Station LMT

Replace the first paragraph of 9.8 with the following:

9.8 Physical Layer definition for high media rate

This clause defines the Physical Layer to be used for the High Media Rate option. This definition applies to both the Station and the C-Port. Operation at 100 Mbit/s is described in section 9.8.1. Operation at 1000

Mbit/s is described in9.8.2. Note that the service primitives within the Physical Layer are defined within 9.8.1 for 100 Mbit/s operation, and defined within 9.8.2 for 1000 Mbit/s operation.

Replace 9.8.2 with the following:

9.8.2 1000 Mbit/s Physical Layer

This section defines the Physical Layer (PHY) to be used for 1000 Mbit/s transmission for both Station and C-Port. This Physical Layer is divided into two sublayers: physical signaling components (PSC) and physical medium components (PMC). The same PSC is used both for twin-axial cable and optical fibre, and hereafter is referred to as the PSC-X. A different PSC is specified for 4-pair Category 5 balanced copper cabling, hereafter referred to as the PSC-T. The PSC and PMC for each of the media types are defined separately. For 1000 Mbit/s operation, this subclause replaces Clause 5.

The PSC-X is specified by incorporating portions of IEEE Std. 802.3, 1998 edition, and IEEE Std. 802.3ab-1999, by reference, with the modifications noted below. The PSC-X sublayer is analogous to the combination of the PCS and PMA sublayers of [802.3], Clause 36 together with a new Reconciliation Sublayer which provides an interface to the MAC.

The 1000 Mbit/s Pants for optical fibre (hereafter referred to as PMC-LX and PMC-SX) and twin-axial cable (hereafter referred to as PMC-CX) media types are specified by incorporating the FibreChannel ANSI X3.230-1994 FC-PH physical and signaling interface specifications, and the associated 8B10B data coding method by reference, (hereafter [FC-PMD]) with the modifications in [802.3], Clause 36.

The PMC-LX sublayer is analogous to the PMD sublayer type 1000BASE-LX of [802.3], Clause 38.

The PMC-SX sublayer is analogous to the PMD sublayer type 1000BASE-SX of [802.3], Clause 38.

The PMC-CX sublayer is analogous to the PMD sublayer type 1000BASE-CX of [802.3], Clause 39 for twin-axial cable media types.

The PSC-T and the 1000 Mbit/s PMC for 4-pair Category 5 balanced copper cabling (hereafter referred to as PMC-T) are specified by incorporating portions of [802.3], by reference with the modifications noted below. The PSC-T sublayer is analogous to the combination of the PCS and PMA sublayers of [802.3], Clause 40 together with a new Reconciliation Sublayer which provides an interface to the MAC. The PMC-T sublayer is analogous to the PMA sublayer of [802.3], Clause 40.

The interface between the MAC and PHY layers is precisely defined by the primitives described below. These primitives are defined in terms of the Gigabit Media Independent Interface (GMII) as specified in [802.3], Clause 35. The following are exceptions to IEEE Std 802.3-1999:

— Exception to 35.2.1 Mapping of GMII signals to PLS service primitives and Station Management:

  The GMII signals shall be mapped to PSC service primitives using a new Reconciliation Sublayer as defined in 9.8.2.1.

— Exceptions to 35.2.2.4 TXD (transmit data):

  The bit weighting of the Token Ring MAC transmit octet is such that D0 represents the MSB and D7 represents the LSB. This is the reverse of that defined in 35.2.2.4.

  TX_ER shall not be asserted while TX_EN is not asserted.

  The column under “PLS_DATA.request parameter” in Table 35-1 shall be ignored.

The transmission of Carrier Extend, Carrier Extend Error, or Reserved Encodings shown in this table is not supported.

— Exceptions to 35.2.2.5 TX_ER (transmit coding error):

TX_ER shall not be asserted while TX_EN is not asserted.

Burst transmission of frames shall not be supported.

Figures 35-5–35-7 shall be ignored.

— Exception to 35.2.2.7 RXD (receive data):

The bit weighting of the Token Ring MAC receive octet is such that D0 represents the MSB and D7 represents the LSB. This is the reverse of that defined in 35.2.2.7.

Reception of RX_DV not asserted while RX_ER is asserted shall be ignored.

Operation in half duplex mode is not supported.

The column under “PLS_DATA.indicate parameter” in Table 35-2 shall be ignored.

The reception of False Carrier Indication, Carrier Extend, or Carrier Extend Error shown in this table shall be ignored.

Burst Reception as shown in Figure 35-10 shall be ignored.

— Exception to 35.2.2.8 RX_ER (receive error):

Reception of RX_DV not asserted while RX_ER is asserted shall be ignored.

The reference to 35.2.1.5 for the definition of the effect of RX_DV on the Reconciliation sublayer shall not apply.

The illustration in Figure 35-11 of the behavior of RX-ER with RX_DV not asserted during the reception of a frame shall be ignored.

— Exception to 35.2.2.9 CRS (carrier sense):

This signal shall not be used.

— Exception to 35.2.2.10 COL (collision detected):

This signal shall not be used.

— Exception to Figure 35-15:

During transmission, the <extend> portion of the GMII data stream shall not be generated. During reception, the <extend> portion of the GMII data stream shall be ignored.

— Exception to Figure 35-16:

The bit weighting of the Token Ring octets is the reverse of that illustrated in Figure 35-16.

— Exception to 35.2.3.1 Interframe <inter-frame>:

TX_ER shall not be asserted, while TX_EN is not asserted.

Reception of RX_DV not asserted, while RX_ER is asserted shall be ignored.

The CRS signal shall not be used.

— Exception to 35.2.3.5 Carrier extension <extend>:

TX_ER shall not be asserted, while TX_EN is not asserted. Therefore, the signalling of carrier extension <extend> on the transmit path is not permitted.

Reception of RX_DV not asserted, while RX_ER is asserted shall be ignored. Therefore, the signalling of carrier extension <extend> on the receive path shall be ignored.

— Exception to 35.2.3.6 Definition of Start of Packet and End of Packet Delimiters

This definition shall be ignored.

— Exception to 35.3 Signal mapping:

The COL and CRS signals shall not be used.

— Exception to 35.4 Electrical characteristics:

The COL and CRS signals shall not be used.

— Exception to 35.5 PICS:

This PICS proforma for Clause 35 shall not apply.

An explicit embodiment of the GMII is not required. If a physical embodiment of the GMII is not present, then the implementation shall provide control and status mechanisms equivalent to those described in described in [802.3], Clause 35 with the exceptions as noted above. If an exposed GMII does exist, it shall meet all requirements of [802.3], Clause 35 with the exceptions as noted above. The interface between the PSC-X and the PMC-LX/SX/CX is the “Ten-Bit Interface (TBI)” as defined in [802.3], Clause 36. Exposing the TBI instead of the GMII is recommended for interfacing between the PSC-X and a PMC-CX, PMC-LX, or PMC-SX sublayer since it provides a more convenient partition between the high frequency circuitry associated with the PMC sublayer and the logic functions associated with the PSC and MAC sublayers. The TBI is intended for use as a chip-to-chip interface. No mechanical connector is specified for use with the TBI.

The clauses listed above may reference other portions of the subject standards. Requirements placed by reference shall be met by the 1000 Mbit/s PHY wherever applicable.

Objectives

— Define a PHY based on standardized and implemented versions of1000BASE-X.
— Define a PHY based on standardized and implemented versions of1000BASE-T.
— Define a simple mapping of GMII signals into MAC primitives, comparable to the mapping of MII signals in the 100 Mbit/s PHY.
— Maintain the equivalent of the existing 4/16/100 Mbit/s ANSI/IEEE Std 802.5-1998 signaling interface.

— Provide a low-cost physical connection for switched Token Ring by using a predefined transceiver.
— Provide a standard interface, capable of being extended to additional media types.

9.8.2.1 1000 Mbit/s MAC to GMII Primitives (Common)

The following service primitives specify the required information that is passed between the PMC, the PSC, the MAC, and the PMAC/SMAC. The service primitives are shown in Figure 2.2-3. The PS_UNITDATA.indication, PS_UNITDATA.request, PS_STATUS.indication, and PS_CONTROL.request service primitives are mapped onto the physical [802.3] GMII signals by the Reconciliation Sublayer as shown in Figure 9.8-1. The GMII signals may optionally be exposed. This GMII is an 8-bit data interface with an 8-bit symbol exchanged with the MAC in each 8 ns GMII clock period. The GMII clock shall have a tolerance of plus or minus 100 ppm or better.

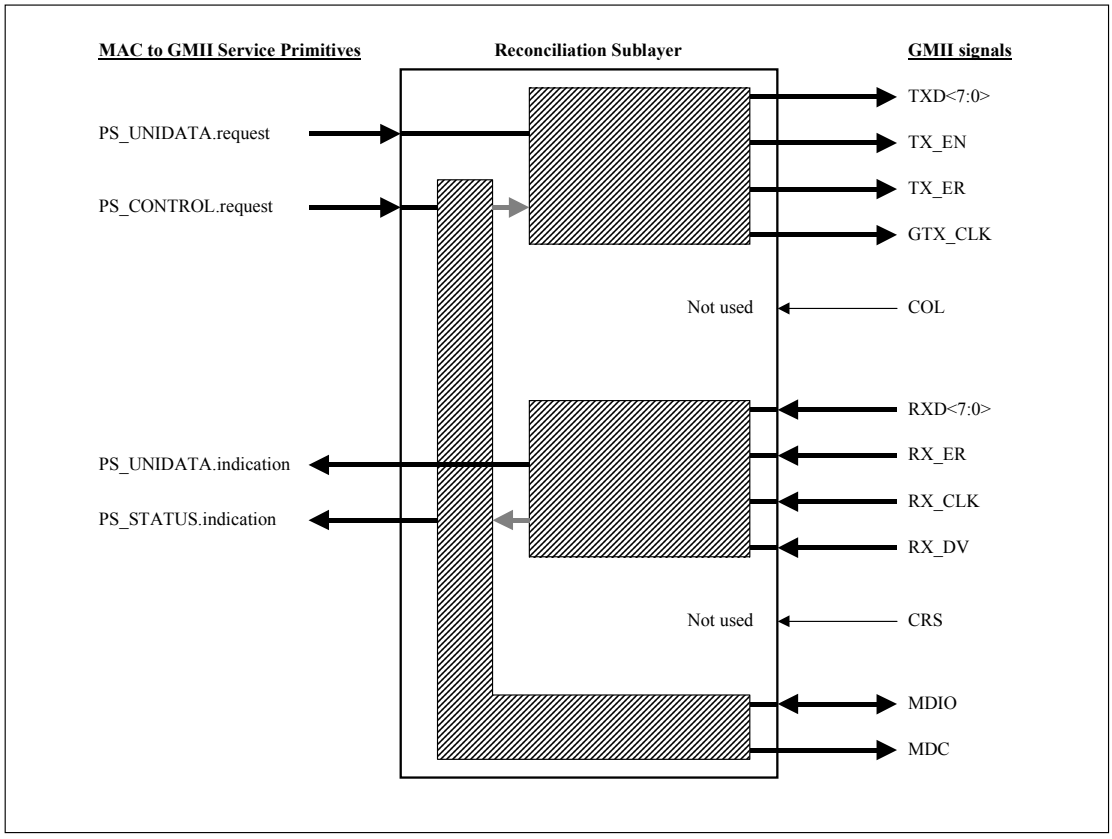


Figure 9.8-1—MAC primitives to GMII Reconciliation Sublayer

9.8.2.1.1 PS_UNITDATA.indication

This primitive defines the transfer of data from the PSC to the MAC. This is described in terms of [802.3] GMII signals. This primitive is mapped from the GMII signals RX_DV and RXD0..7 via the Reconciliation Sublayer. A PS_UNITDATA.indication is synchronous to the GMII RX_CLK rising edge.

PS_UNITDATA.indication[Rcv_Indicator]

The Rcv_Indicator is one of the following:

— Idle
— Start_stream_delimiter
— Data_octet
— End_stream_delimiter

Idle is only used between frames. The Rcv_Indicator indicates an Idle on every GMII RX_CLK rising edge in which the GMII signal RX_DV was not asserted at the previous GMII RX_CLK rising edge. Idle is used for Fill.

Start_stream_delimiter indicates the reception of the beginning of a valid stream. This indication is generated on the second GMII RX_CLK rising edge in which RX_DV is asserted. A Start_stream_delimiter indication may only follow an Idle.

Data_octet indications may only follow a previous Data_octet or Start_stream_delimiter indication and are represented by GMII signal RX_DV remaining asserted. Data shall be latched from the GMII RXD signals on each GMII RX_CLK rising edge and assembled into MAC octets. The Reconciliation Sublayer shall map the RXD0..7 GMII signals onto the MAC receive octet data as shown in Table 9.8-6. Note that this data is invalid and will be treated as nondata when a PS_STATUS.indication[frame_violation] is simultaneously indicated.

Table 9.8-5—Receive Bit Ordering

MAC OCTET DESCRIPTION							
D0	D1	D2	D3	D4	D5	D6	D7
RXD0	RXD1	RXD2	RXD3	RXD4	RXD5	RXD6	RXD7
GMII BYTE DESCRIPTION							

End_stream_delimiter indicates the end of a data stream. An End_stream_delimiter is indicated on the first GMII RX_CLK rising edge at which RX_DV is sampled deasserted. An End_stream_delimiter may only be generated immediately following a Data_octet or Start_stream_delimiter.

9.8.2.1.2 PS_UNITDATA.request

This primitive defines the transfer of data from the MAC to the PSC. The primitive is mapped to [802.3] GMII signals TX_EN and TXD0..7 via the Reconciliation Sublayer. A PS_UNITDATA.request is synchronous to the GMII GTX_CLK rising edge.

PS_UNITDATA.request[Tx_Indicator]

The Tx_Indicator specified is one of the following:

— Idle
— Start_stream_delimiter
— Data_octet
— End_stream_delimiter

Idle is used only between frames. When Tx_Indicator requests an Idle, the GMII signal TX_EN will be deasserted.

Start_stream_delimiter is used to request the beginning of a valid frame. This causes the assertion of TX_EN for two GMII GTX_CLK periods. A Start_stream_delimiter can only follow an Idle indicator. The value driven on GMII signals TXD0..7 during these two GMII GTX_CLK periods is not defined and is ignored by the PSC.

Data_octet requests are requested on each GTX_CLK rising edge between a Start_stream_delimiter and an End_stream_delimiter. At all other times the TXD0..7 pattern shall be ignored by the PSC. A Data_octet request may only follow a previous Data_octet request or a Start_stream_delimiter. The Reconciliation Sublayer shall map the MAC transmit octet data onto the TXD0..7 GMII signals as shown in Table 9.8-6.

Table 9.8-6—Transmit Bit Ordering

MAC OCTET DESCRIPTION							
D0	D1	D2	D3	D4	D5	D6	D7
TXD0	TXD1	TXD2	TXD3	TXD4	TXD5	TXD6	TXD7
GMII BYTE DESCRIPTION							

End_stream_delimiter is used to request the end of a valid stream. The End_stream_delimiter is signalled by deassertion of TX_EN prior to the next rising edge of GTX_CLK after a Start_stream_delimiter or a Data_octet request.

9.8.2.1.3 PS_STATUS.indication

This primitive is used by the PSC to inform the MAC of errors and significant status changes.

PS_STATUS.indication [Frame_violation,

Abort_frame,

Link_status]

Frame_violation is an indication of a coding error received inside frame boundaries. Frame_violation at 1000 Mbit/s shall be defined as the logical AND of [802.3 GMII Receive_Error (RX_ER)] with [802.3 GMII Receive_Data_Valid (RX_DV)] and with NOT Abort_frame. Note that in generating the Frame_violation indication, a pipeline delay is required to ensure that the assertion of RX_ER does not form part of an Abort_frame indication.

Abort_frame indicates that an abort signal has been received. Abort shall be asserted only if GMII RX_ER is sampled asserted in both of the last two octets prior to the End_stream_delimiter.

Link_status indicates that the PHY is receiving a valid signal from the remote PHY. Link_status is equivalent to the state of the GMII status register, bit 1.2.

Link_status equals Asserted when the bit was last read as logic one.

Link_status equals Not_asserted when the bit was last read as logic zero.

Link_status shall be updated (read) at least every 500 ms.

9.8.2.1.4 PS_CONTROL.request

This primitive is used by the MAC to request certain actions of the PSC.

PS_CONTROL.request [Initialize,
Transmit_mode,
Remove_phy,
Report_capabilities,
Media_Rate,
Crystal_transmit,
Abort_frame]

Initialize is used to restart normal PHY operation from a removed state. Note that this definition supersedes that of 9.8.1 only when 1000 Mbit/s operation is required. Initialize at 1000 Mbit/s shall be defined as writing to the [802.3], Clause 22 Control register (register 0) as follows:

Table 9.8-7—Initialization State

Address	Value
0.15	1 (SC)[a]
0.14	0
0.13	0 (For Media_Rate = 3)[b]
0.12	0 (FxANO=1)[c]
0.11	0
0.10	1
0.9	0
0.8	1
0.7	0
0.6	1 (For Media_Rate = 3)[b]
0.5:0.0	Reserved

[a]SC = Self-Clearing. This bit will be set to zero when the reset process is complete. During reset, writes to other bits in this and other registers may have no effect.
[b]The state of this bit is defined in 9.8.1 for Media_Rate = 2, and is undefined for other media rates.
[c]The state of this bit is undefined for FxANO=0.

Transmit_mode is used by the MAC to control the data path through the PHY. Transmit mode has three states:

— Fill

— No_fill
— Repeat (C-Port only)

For 1000 Mbit/s operation, the provision of a PHY hardware repeat path is optional.

If no PHY hardware repeat path is provided then Transmit_mode has no effect on the PHY.

If a hardware repeat path is provided then when Transmit_mode is repeat, the received GMII signals RX_DV, RX_ER and RXD0..7 from the PSC should be retransmitted back to the PSC unchanged on the transmit GMII signals TX_EN, TX_ER and TXD0..7, respectively. When Transmit_mode is Fill, then TX_EN and TX_ER should be deasserted. The values driven on TX_ER and TXD0..7 during Fill are not defined. When Transmit_mode is No_fill, then the transmit GMII signals are driven by the MAC through the Reconciliation Sublayer as defined by the PS_UNITDATA.request[Tx_Indicator] primitive.

Remove_phy is intended to halt operation of the PHY. The exact state of the PHY after Reset is asserted is undefined. Suggested actions are setting the Reset (0.15) or Power Down (0.11) bits of the [802.3, Clause 22 Control register (register 0)].

Report_capabilities is a request from the MAC for the PHY to generate a report of its capabilities. When issued, the PHY shall respond with the settings of the [802.3, Clause 22 Status register (register 1)].

Media_Rate is a request from the MAC for the PHY to operate at a specific data rate. For 1000 Mbit/s operation Media_Rate has the following value:

— Media_Rate=3

Other values for Media_Rate are not described in this section.

Media_Rate=3 causes the PHY to operate at 1000 Mbit/s. The 1000 Mbit/s rate is supported by setting [802.3], Clause 22 Control register (register 0) bit 0.13 to logical zero, bit 0.6 to logical one, and bit 0.12 to logical zero.

See PS_CONTROL.request[Initialize].

Crystal_transmit is used to control the clock source of the PHY's transmitter. The 1000 Mbit/s PHY only supports transmission from its local crystal and therefore Crystal_transmit is always asserted.

Abort_frame is a request that the current frame be terminated with the Abort_frame signal. The Abort_frame signal shall consist of asserting the TX_ER GMII signal on the last two octets prior to the deassertion of TX_EN.

9.8.2.2 1000 Mbit/s PSC to PMC Primitives

The following service primitives specify the required information that is passed between the PMC and the PSC. In the following, symbols are exchanged at an 8 ns time interval.

9.8.2.2.1 PM_UNITDATA.indication

This primitive defines the transfer of received data from the PMC to the PSC.

PM_UNITDATA.indication[Rcv_symbol]

Rcv_symbol is an encoded symbol. Note that the nature of the PMC/PSC interface depends upon the PSC.

When interfacing to a PSC-X this will be a 10-bit symbol coded according to the rules and tables of the 8B10B coding scheme of [802.3], Clause 36. This service primitive is then logically equivalent to the [802.3], Clause 36 primitive PMA_UNITDATA.indicate(rx_code_group<9:0>).

When interfacing to a PSC-T this will be the vector of four parallel quinary symbols detected on the pairs BI_DA, BI_DB, BI_DC and BI_DD defined in [802.3], Clause 40. This service primitive is then logically equivalent to the [802.3], Clause 40 primitive PMA_UNITDATA.indicate(rx_symb_vector).

9.8.2.2.2 PM_UNITDATA.request

This primitive defines the transfer of data from the PSC to the PMC.

PM_UNITDATA.request[Tx_symbol]

Tx_symbol is an encoded symbol. Note that the nature of the PSC/PMC interface depends upon the PSC.

When interfacing to a PSC-X this will be a 10-bit symbol coded according to the rules and tables of the 8B10B coding scheme of [802.3], Clause 36. This service primitive is then logically equivalent to the [802.3], Clause 36 primitive PMA_UNITDATA.request(tx_code_group<9:0>).

In a PSC-T, this will be the vector of four parallel quinary symbols to be driven onto the pairs BI_DA, BI_DB, BI_DC, and BI_DD defined in [802.3], Clause 40. This service primitive is then logically equivalent to the [802.3], Clause 40 primitive PMA_UNITDATA.request(tx_symb_vector).

9.8.2.3 Media Dependent PSC Specifications

9.8.2.3.1 PSC-X

The PSC-X shall meet all the requirements of [802.3], Clause 36, with the exceptions listed below. Where there is conflict between specifications in [802.3] and those in this standard, those of this standard shall prevail.

The TBI, if exposed, shall meet all applicable requirements of [802.3], Clause 36.

Symbols are encoded according to the rules and tables of the 8B10B coding scheme defined in [802.3], Clause 36. The coding scheme assumes knowledge of the concepts of 1000BASE-X code-groups, ordered_sets, odd/even alignment, and of running disparity. These concepts are explicitly defined in [802.3], Clause 36. The use of these code-groups within the ANSI/IEEE Std 802.5-1998 frame sequence is described in 14.2.2.2.

The following code-groups are valid for PSC-X:

Table 9.8-8—PSC-X Ordered Sets and Code Groups

Code	ANSI/IEEE Std 802.5-1998 Use	Number of Code_Groups
/C1/	Reserved and not currently used by ANSI/IEEE Std 802.5-1998	4
/C2/	Reserved and not currently used by ANSI/IEEE Std 802.5-1998	4
/S/	Used only at start of SSD sequence	1

Table 9.8-8—PSC-X Ordered Sets and Code Groups *(continued)*

Code	ANSI/IEEE Std 802.5-1998 Use	Number of Code_Groups
/D/	Used in SSD sequence and frame data	1
/V/	Used only as part of AT sequence	1
/T/	Used only at start of ESD sequence	1
/R/	Used only in ESD sequence	1
/I1/	Used in IFG and FILL sequences	2
/I2/	Used in IFG and FILL sequences	2

There is no preamble before the encapsulated frame as shown in [802.3], Clause 36.

The use of the /R/ symbol for carrier extension or packet bursting ([802.3], Clause 36) is not supported. The /R/ symbol shall only be transmitted within an End_stream_delimiter.

No carrier sense or collision detect indications (GMII signals CRS or COL) are required or specified.

Auto-Negotiation shall be disabled within PSC-X. The configuration ordered sets (/C1/ and /C2/) shall not be transmitted.

The delay constraints of [802.3], subclause 36.5 are not mandatory for PSC-X.

There is no support for a PSC-X repeater.

9.8.2.3.2 PSC-T

The PSC-T shall meet all requirements of [802.3], Clause 40, with the exceptions listed below. Where there is conflict between specifications in [802.3] and those in this standard, those of this standard shall prevail.

The GMII, if exposed, shall meet all applicable requirements of [802.3], Clause 35, with the exceptions as described below. Where there is conflict between specification in [802.3], Clauses 35 and 40, and those in this standard, those of this standard shall prevail.

Auto-Negotiation must be supported for PSC-T operation. The Auto-Negotiation register set shall comply with [802.3], Clause 28 with the amendments described in Annex Z. Note that the selection of the clock master and clock slave of a link is part of the Auto-Negotiation process for PSC-T operation. For ANSI/IEEE Std 802.5-1998 purposes, the [802.3] terms “Single-port device” and “Multiport device” should not be interpreted as Station and C-Port.

The [802.3] “conditions” which are used for PSC-T operation are shown in Table 9.8-9. Conditions are directly related to GMII signals and are transmitted at 8 ns intervals. Each of these conditions maps directly to quinary-symbols on the four wire pairs. A quinary-symbol has one of five numeric values, {2, 1, 0, –1, –2}, which correspond to the five voltage signaling levels. Note that a single [802.3] condition may map to several possible quinary-symbol vectors. The coding scheme used to map conditions to quinary-symbol vectors is described in [802.3], Clause 40. The use of these conditions within the ANSI/IEEE Std 802.5-1998 frame sequence is described in 14.2.2.3.

The carrier extension and packet bursting facilities of [802.3] are not used.

Table 9.8-9—PSC-T conditions

Condition	ANSI/IEEE Std 802.5-1998 Use
SSD1	Used only at start of an SSD sequence.
SSD2	Used only as part of an SSD sequence.
Normal	Encoded data octet.
Xmt_err	Used only to signal a Transmit_Abort. Xmt_err should be present for the last two clocks before the CSReset at the end of a stream to indicate a Transmit_abort.
CSReset	Used to reset the convolutional decoder within an ESD sequence.
ESD1	Used only as part of an ESD sequence.
ESD2_Ext_0	Used only as part of an ESD sequence. No carrier extension defined.
ESD2_Ext_1	Reserved and not currently used by ANSI/IEEE Std 802.5-1998.
ESD2_Ext_2	Reserved and not currently used by ANSI/IEEE Std 802.5-1998.
CSExtend	Reserved and not currently used by ANSI/IEEE Std 802.5-1998.
CSExtend_Err	Reserved and not currently used by ANSI/IEEE Std 802.5-1998.
Idle/CarrierExtension	Used to indicate idles during IFG and FILL.

No carrier sense or collision detect indications (GMII signals CRS or COL) are required or specified.

The delay constraints of [802.3], 40.11 are not mandatory for PSC-T.

There is no support for a PSC-T repeater.

9.8.2.4 Media Dependent PMC Specifications

9.8.2.4.1 Short Haul Twin-axial Media Dependent Specifications (PMC-CX)

The PMC for short haul copper connections is specified by [802.3], Clause 39 1000BASE-CX PMD in combination with the [802.3], Clause 36 PMA. This must be used only in conjunction with the PSC-X.

Two alternative MICs are specified for use with PMC-CX as follows:

— **Style-1 connector:** a 9-pin shielded D-subminiature with the mechanical mating interface defined by IEC 60807-3.
— **Style-2 connector:** an 8-pin ANSI Fibre Channel style-2 connector with mechanical mating interface defined by IEC 61076-3-103.

9.8.2.4.1.1 Crossover Function

In order to simplify C-Port hardware for PMC-CX, the cabling crossover function will be always be carried out in the cable plant, as specified in [802.3], subclause 39.5.2, and not by the C-Port hardware. In this respect the implementation of PMC-CX is similar to that of PMC-LX and PMC-SX.

9.8.2.4.1.2 Full Duplex Capability

The Physical Layer device shall support Full Duplex transmission.

9.8.2.4.2 Fibre-Optic Media Dependent Specifications (PMC-LX and PMC-SX)

The two PMCs for fibre, PMC-LX and PMC-SX, are specified in 13.10.

9.8.2.4.3 Long Haul Twisted-Pair Media Dependent Specifications (PMC-T)

The PMC for long haul copper connections is specified by [802.3], Clause 40 Physical coding sublayer (PCS) and physical medium attachment (PMA) sublayer and baseband medium, type 1000BASE-T. This must be used only in conjunction with the PSC-T.

9.8.2.4.3.1 Full Duplex Capability

The Physical Layer device shall support Full Duplex transmission.

9.8.2.4.3.2 Crossover Function

The crossover function is implemented as described in [802.3], Clause 40. Both Station and C-Port MICs should be configured to have pinouts specified in [802.3]. The Management Interface registers of a C-Port should be initialized to have a preference to be a “Multiport device” and the Management Interface of a Station should be initialized to have a preference to be a “Single-port device.” This will simplify the crossover negotiation phase between link partners.

11. DTR Station and C-Port management

Replace 11.3 with the following:

11.3 Management information definitions

11.3.1 DTR MAC MIB definitions

Note on special word usage in the MIB definitions: The terms “shall,” “mandatory,” and “required” in the MIB definition are constrained within the definition of the MIB itself. Implementation of the MIB is optional by this standard.

```
DtrMacMIB DEFINITIONS ::= BEGIN

IMPORTS
       transmission
              FROM RFC1213-MIB
       MODULE-IDENTITY, OBJECT-TYPE, Counter32, NOTIFICATION-TYPE
              FROM SNMPv2-SMI
       InterfaceIndex
              FROM IF-MIB
       MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP
              FROM SNMPv2-CONF
       TruthValue, DisplayString, MacAddress, TimeStamp
              FROM SNMPv2-TC;

dtrMacMIB MODULE-IDENTITY
```



```
       LAST-UPDATED "9826081035Z"
       ORGANIZATION "IEEE 802.5"
       CONTACT-INFO
                    "Katie D. Lee
                    IBM
                    CNMA/664
                    RTP, NC 27709
                    kdlee@vnet.ibm.com
                    (919) 254-7507

                    Simon Harrison
                    Madge Networks Ltd.
                    Wexham Springs
                    Framewood Road
                    Wexham
                    Slough
                    SL3 6PJ
                    United Kingdom
                    Simon.Harrison@Madge.Com
                    +44 1753 661 421"

       DESCRIPTION
              "The MIB module for dedicated token ring MACs."
       ::= {transmission 86 }

dtrMacObjects     OBJECT IDENTIFIER ::= { dtrMacMIB 1 }
dtrMacTraps       OBJECT IDENTIFIER ::= { dtrMacMIB 2 }
dtrMacConformance OBJECT IDENTIFIER ::= { dtrMacMIB 3 }

--*******************************************************

-- This SNMP MIB module contains definitions for management
-- of both the DTR Station (SMAC) and the DTR C-Port (PMAC).
--
-- A DTR Station using TXI protocol has an entry in the
-- following tables:
--     txiProtocolTable
--     dtrStationTable
--
-- A DTR Station using TKP protocol shall implement RFC 1748
-- IEEE 802.5 token ring MIB, as well as the following table:
--     dtrStationTable
--
-- A C-Port in Port mode using TXI protocol has an entry in each of the
-- following tables:
--     txiProtocolTable
--     dtrCportTable
--
-- A C-Port in Port mode using TKP protocol shall implement RFC 1748 IEEE 802.5
-- token ring MIB, as well as the following table:
--     dtrCportTable
--
-- A C-Port in Station Emulation mode using TXI protocol has an
-- entry in each of the following tables:
--     txiProtocolTable
--     dtrStationTable
--     dtrCportTable
--
-- A C-Port in Station Emulation mode using TKP protocol shall implement
```

```
-- RFC 1748 IEEE 802.5 token ring MIB, as well as the following tables:
--     dtrCportTable
--     dtrStationTable
--
--*******************************************************

-- Relationship to RFC 1573

-- Layering model
--  For the typical usage of this IEEE 802.5 DTR MIB module, there will
--  be no sublayers "above" or "below" the 802.5 DTR interface. However,
--  this MIB module does not preclude such layering.

-- Virtual circuits
--  802.5 DTR does not support virtual circuits.

-- ifTestTable
--  This MIB module does not define tests.
-- ifRcvAddressTable
--  The ifRcvAddressTable is defined to contain all MAC addresses,
--  unicast, multicast (group), and broadcast, for which an interface
--  will receive packets. For 802.5 DTR interfaces, its use includes
--  functional addresses. The format of the address, contained in
--  ifRcvAddressAddress, is the same as for ifPhysAddress.

--  For functional addresses on a particular 802.5 DTR interface, only
--  one ifRcvAddressTable entry is required. That entry is the one for
--  the address that has the functional address bit ANDed with the bit
--  mask of all functional address for which the interface will accept
--  frames.

-- ifPhysAddress
--  For an 802.5 DTR interface, ifPhysAddress contains the interface's IEEE
--  MAC address, stored as an octet string of length 6, in IEEE 802.1
--  "canonical" order, i.e., the Group Bit is positioned as the low-order
--  bit (0x01) of the first octet.

-- ifType
-- The objects defined in this MIB module apply to each interface for which
--  the ifType has the value:
--    iso88025Dtr = 86

--*******************************************************
-- TXI Protocol
--  This table provides information about an 802.5 TXI MAC.
--  A managed system will have one entry in this table
--  for each of its TXI MAC interfaces. It is mandatory
--  that systems having TXI interfaces implement this
--  table in addition to the generic interfaces table and
--  its generic extensions, defined in RFC 1573.
-- *******************************************************
txiProtocolTable    OBJECT-TYPE
 SYNTAX        SEQUENCE OF TxiProtocolEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This table contains TXI interface characteristics.
    There is one entry for each TXI interface in the
    managed system."
```



```
::= { dtrMacObjects 1 }

txiProtocolEntry    OBJECT-TYPE
 SYNTAX        TxiProtocolEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "A list of characteristics for an 802.5 TXI interface."
 INDEX
   { txiProtocolIfIndex }
::= { txiProtocolTable 1 }

TxiProtocolEntry ::= SEQUENCE {
  txiProtocolIfIndex                    InterfaceIndex,
  txiProtocolMacType                    INTEGER,
  txiProtocolFunctionalAddress          MacAddress,
  txiProtocolUpstreamNeighborAddress    MacAddress,
  txiProtocolMicrocodeLevel             OCTET STRING,
  txiProtocolProductInstanceId          OCTET STRING,
  txiProtocolAuthorizedFunctionClasses  OCTET STRING,
  txiProtocolErrorReportTimer           INTEGER,
  txiProtocolPhysicalDropNumber         OCTET STRING,
  txiProtocolRingNumber                 OCTET STRING,
  txiProtocolRingStatus                 INTEGER,
  txiProtocolJoinState                  INTEGER,
  txiProtocolMonitorState               INTEGER,
  txiProtocolBeaconSA                   MacAddress,
  txiProtocolBeaconType                 INTEGER,
  txiProtocolBeaconUNA                  MacAddress,
  txiProtocolBeaconPDN                  OCTET STRING,
  txiProtocolEventStatus                INTEGER }

txiProtocolIfIndex    OBJECT-TYPE
 SYNTAX        InterfaceIndex
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This object identifies the interface for which this entry contains
    management information. The value of this object for a particular
    interface has the same value as the ifIndex object, defined in
    RFC 1573, for the same interface."
::= { txiProtocolEntry 1 }

txiProtocolMacType    OBJECT-TYPE
 SYNTAX        INTEGER{ Station(1), cPortPortMode(2), cPortStnEmulation(3) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This objects indicates whether this MAC interface is a Station, a
    C-Port in Port mode, or a C-Port in Station Emulation mode."
::= { txiProtocolEntry 2 }

txiProtocolFunctionalAddress    OBJECT-TYPE
 SYNTAX        MacAddress
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the Functional Addresses
    subvector X'2C' used in the Report Station Addresses and Report Station
```

```
    Attachments MAC frames. The value of this object can be set by
    management."
::= { txiProtocolEntry 3 }

txiProtocolUpstreamNeighborAddress    OBJECT-TYPE
 SYNTAX        MacAddress
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the individual address of the nearest
    upstream neighbor. The value of this object is derived
    from the Heart Beat frame."
::= { txiProtocolEntry 4 }

txiProtocolMicrocodeLevel    OBJECT-TYPE
 SYNTAX        OCTET STRING (SIZE(1..32))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the Ring Station Version
    Number subvector X'23' used in the Report Station State MAC frame.
    The value of this object cannot be set by management."
::= { txiProtocolEntry 5 }

txiProtocolProductInstanceId    OBJECT-TYPE
 SYNTAX        OCTET STRING (SIZE(1..31))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the Product Instance ID subvector
    X'22' used in the Report Station Attachment and Report New Active
    Monitor MAC frames. The value of this object cannot be set by
    management."
::= { txiProtocolEntry 6 }

txiProtocolAuthorizedFunctionClasses    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value set by the Authorized
    Function Classes subvector X'06' of the Change Parameters
    MAC frame."
::= { txiProtocolEntry 7 }

txiProtocolErrorReportTimer    OBJECT-TYPE
 SYNTAX        INTEGER (0..65535)
 UNITS         "1/100 second"
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the timer TSER as set by
    the Error Timer Value subvector X'05' from the Change Parameters
    or the Initialize Station MAC frame. This object indicates the
    value in 0.01 s increments."
::= { txiProtocolEntry 8 }

txiProtocolPhysicalDropNumber    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(4))
```



```
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value set by the Assign Physical Drop
    Number subvector X'04' of the Change Parameters or the Initialize
    Station MAC frame."
::= { txiProtocolEntry 9 }

txiProtocolRingNumber    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value set by the Local Ring Number
    subvector X'03' from the Change Parameters or Initialize Station
    MAC frame."
::= { txiProtocolEntry 10 }

txiProtocolRingStatus    OBJECT-TYPE
 SYNTAX        INTEGER (0..262143)
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The current interface status that can be used to diagnose
    fluctuating problems that can occur on token rings, after
    a Station has successfully been added to the ring.

    Before an open is completed, this object has the value for
    the 'no status' condition. The txiProtocolRingStatus objects
    provide for debugging problems when the Station cannot even
    enter the ring.

    The object's value is a sum of values, one for each currently
    applicable condition. The following values are defined for
    various conditions:
              0 = No problems detected
              1 = Link_status deasserted
              2 = Remove Alert received
             32 = Ring Recovery
            256 = Remove Received
            512 = reserved
           1024 = Auto-Removal Error
           2048 = Lobe Wire Fault
           4096 = Transmit Beacon
           8192 = Soft Error
         16 384 = Hard Error
         32 768 = Signal Loss
        131 072 = no status, open not completed."
::= { txiProtocolEntry 11 }

txiProtocolJoinState    OBJECT-TYPE
 SYNTAX        INTEGER{
                    notSpecified(1),
                    bypass(2),
                    registration(3),
                    lobeTest(4),
                    duplicateAddrCheck(5),
                    duplicateAddrDetected(6),
                    joinCompleteTXI(7),
```

```
                    awaitNotification(8),
                    removeAlertWait(9),
                    highMediaRateTradeUp(10) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the present state of the Join FSM. The value will
    be one of the following:
              (1) notSpecified,
              (2) bypass (JS=BP),
              (3) registration (JS=PREG or JS=SREG),
              (4) lobeTest (JS=PLT or JS=SLT),
              (5) duplicateAddrCheck (JS=PDAC or JS=SDAC),
              (6) duplicateAddrDetected (JS=PDAD),
              (7) joinComplete TXI (JS=PJCI or JS=SJC),
              (8) awaitNotification (JS=PANNC),
              (9) removeAlertWait (JS=PRAW or JS=SRAW),
             (10) highMediaRateTradeUp (JS=PHMRTU or JS=SHMRTU)"
::= { txiProtocolEntry 12 }

txiProtocolMonitorState    OBJECT-TYPE
 SYNTAX        INTEGER{
                    notSpecified(1),
                    operational(2),
                    beaconTransmit(3),
                    wireFaultDelay(4),
                    internalTest(5) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the present state of the Monitor FSM.
    The value will be one of the following:
       (1) notSpecified,
       (2) Operational (MS=POPT or MS=SOPT),
       (3) TransmitBeacon (MS=PTBN or MS=STBN),
       (4) wireFaultDelay (MS=PITW or MS=SITW)
       (5) Internal Test Wait (MS=PIT or MS=SIT)."
::= { txiProtocolEntry 13 }

txiProtocolBeaconSA    OBJECT-TYPE
 SYNTAX        MacAddress
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the source address used in the last Beacon MAC
    frame transmitted or received."
::= { txiProtocolEntry 14 }

txiProtocolBeaconType    OBJECT-TYPE
 SYNTAX        INTEGER{
                    type1(1),
                    type2(2),
                    type3(3),
                    type4(4),
                    type5(5) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the Beacon Type subvector X'01'
```



```
    used in the last Beacon MAC frame transmitted or received as follows:
       (1) notSpecified
       (2) signalLoss
       (3) notUsed
       (4) notUsed
       (5) heartBeatFailure"
::= { txiProtocolEntry 15 }

txiProtocolBeaconUNA    OBJECT-TYPE
 SYNTAX        MacAddress
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the UNA subvector X'02' used in
    the last Beacon MAC frame transmitted or received."
::= { txiProtocolEntry 16 }

txiProtocolBeaconPDN    OBJECT-TYPE
 SYNTAX        OCTET STRING (SIZE(4))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the Physical Drop Number subvector
    X'0B' used in the last Beacon MAC frame transmitted or received."
::= { txiProtocolEntry 17 }

txiProtocolEventStatus    OBJECT-TYPE
 SYNTAX        INTEGER {
                    macInsertREQReceived(1),
                    macInsertRSPReceived(2),
                    reportError(3),
                    heartBeatLost(4),
                    signalLoss(5),
                    beaconReceived(6),
                    remove(7),
                    internalError(8),
                    StationOrCPortError(9),
                    wireFault(10),
                    claimReceived(11),
                    purgeReceived(12),
                    standbyReceived(13),
                    invalidSourceAddress(14),
                    activeMonitorReceived(15),
                    phantomLoss(16),
                    duplicateAddressDetected(17),
                    removeAlertReceived(18),
                    link_statusDeasserted(19) }
 MAX-ACCESS    accessible-for-notify
 STATUS        current
 DESCRIPTION
    "This object specifies the latest event status of the TXI interface."
::= { txiProtocolEntry 18 }

-- ****************************************************
-- Station Protocol Characteristics Table
--  This table contains protocol information for DTR Stations
--  and C-Ports in Station Emulation mode (both TKP and TXI).
--  There is an entry in this table for each Station
--  in a managed system.
```

```
-- ******************************************************

dtrStationTable    OBJECT-TYPE
 SYNTAX        SEQUENCE OF DtrStationEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This table contains characteristics for each DTR Station.
    There is one entry for each interface in the managed system."
::= { dtrMacObjects 2 }

dtrStationEntry    OBJECT-TYPE
 SYNTAX        DtrStationEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "A list of Station characteristics."
 INDEX
    { dtrStationIfIndex }
::= { dtrStationTable 1 }

DtrStationEntry ::= SEQUENCE {
  dtrStationIfIndex                      InterfaceIndex,
  dtrStationStationType                  INTEGER,
  dtrStationCurrentAccessProtocol        INTEGER,
  dtrStationRequestedAccessProtocol      OCTET STRING,
  dtrStationAccessProtocolResponse       OCTET STRING,
  -- policy variables
  dtrStationAccessProtocolMask           OCTET STRING,
  dtrStationIndividualAddressCount       OCTET STRING,
  dtrStationMaxFrameSize                 INTEGER,
  dtrStationPhantomDriveSupport          OCTET STRING,
  -- policy flags
  dtrStationAdminErrorCountingOption     INTEGER,
  dtrStationAdminOpenOption              INTEGER,
  dtrStationAdminRegistrationOption      INTEGER,
  dtrStationAdminRejectRemoveOption      INTEGER,
  dtrStationAdminMediumRateOption        INTEGER,
  dtrStationAdminRegistrationQueryOption INTEGER,
  dtrStationAdminRegistrationDeniedOption INTEGER,

  dtrStationOperErrorCountingOption      INTEGER,
  dtrStationOperOpenOption               INTEGER,
  dtrStationOperRegistrationOption       INTEGER,
  dtrStationOperRejectRemoveOption       INTEGER,
  dtrStationOperMediumRateOption         INTEGER,
  dtrStationOperRegistrationQueryOption  INTEGER,
  dtrStationOperRegistrationDeniedOption INTEGER,  -- HMR policy flags
  dtrStationAdminAutoNegotiationOption   INTEGER,
  dtrStationAdminAbortSequenceOption     INTEGER,
  dtrStationAdminHMRTradeUpOption        INTEGER,
  dtrStationAdminLobeMediaTestOption     INTEGER,

  dtrStationOperAutoNegotiationOption    INTEGER,
  dtrStationOperAbortSequenceOption      INTEGER,
  dtrStationOperHMRTradeUpOption         INTEGER,
  dtrStationOperLobeMediaTestOption      INTEGER
   }
```



```
dtrStationIfIndex    OBJECT-TYPE
 SYNTAX        InterfaceIndex
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This object identifies the interface for which this entry contains
    management information. The value of this object for a particular
    interface has the same value as the ifIndex object, defined in RFC 1573,
    for the same interface."
::= { dtrStationEntry 1 }

dtrStationStationType    OBJECT-TYPE
 SYNTAX        INTEGER { dtrStation(1), cPortInStnEmulation(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies whether this entry is a DTR Station or a C-Port
    in Station Emulation mode."
::= { dtrStationEntry 2 }

dtrStationCurrentAccessProtocol    OBJECT-TYPE
 SYNTAX        INTEGER { tKP(1), tXI(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies which access protocol is currently in use by the
    MAC. The value of this object is either (1) TKP or (2) TXI.
    This object cannot be set by management."
::= { dtrStationEntry 3 }

dtrStationRequestedAccessProtocol    OBJECT-TYPE
 SYNTAX        OCTET STRING (SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the access protocol Request subvector
    X'0E' transmitted in the Registration Request MAC frame. The value
    X'0002' indicates TXI access protocol. The value X'0006' indicates TXI
    access protocol and the Station is capable of operating at 100 Mbit/s.
    If the Station is running TKP protocol, the value is X'FFFF'. All
    other values are reserved for future standardization."
::= { dtrStationEntry 4 }

dtrStationAccessProtocolResponse    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the value of the access protocol Response subvector
    X'0F' received from the Registration Response MAC frame. The value
    X'0000' means access denied and the value X'0002' indicates TXI and
    phantom and wire fault support method accepted.  The value X'0004'
    indicates that the C-Port will support the Station's 100 Mbit/s capability."
::= { dtrStationEntry 5 }

dtrStationAccessProtocolMask    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-write
 STATUS        current
```

```
 DESCRIPTION
    "This object specifies which access protocols can be supported by the
    Station. This object indicates the value of the SPV(AP_MASK)
    variable. The value of this object is either: X'0001' (TKP),
    X'0002'(TXI), or X'0003' (TKPAndTXI)."
::= { dtrStationEntry 6 }

dtrStationIndividualAddressCount    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the number of individual addresses supported
    by the MAC. This object is used to set the value of the Individual
    Address Count subvector X'21'. A value of X'0000' means
    that more than one individual address is not supported.
    A nonzero value specifies the number of individual address in use
    by this MAC."
::= { dtrStationEntry 7 }

dtrStationMaxFrameSize    OBJECT-TYPE
 SYNTAX        INTEGER(133..18211)
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the maximum frame size that a MAC
    will transmit and indicates the value of the SPV(MAX_TX) variable.
    At 4 Mbit/s, the maximum permitted value is 4550. At 16 Mbit/s, the
    maximum permitted value is 18 200. At 100 Mbit/s, the maximum permitted
    value is 18 207. At 1000 Mbit/s, the maximum permitted value is 18 211."
::= { dtrStationEntry 8 }

dtrStationPhantomDriveSupport    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the MAC's support of Phantom Drive
    and Wire Fault detection. This object indicates the value of the
    SPV(PD) variable and the value of the Phantom subvector
    X'0C' used in the Registration Request MAC frame.  The value X'0001'
    indicates that the Station supports phantom signaling and wire fault
    detection as described in ISO/IEC 8802-5:1998.  The value X'0002'
    indictates that the Station does not support phantom signaling."
::= { dtrStationEntry 9 }

dtrStationAdminErrorCountingOption    OBJECT-TYPE
 SYNTAX        INTEGER {triggered(1), freeRunning(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies how the MAC manages the error report timer.
    If set to triggered(1), the MAC resets TSER when the first error is
    received and, when TSER expires, sends an error report MAC frame.
    If set to freeRunning(2), each time TSER expires the MAC resets TSER
    and, if any of the error counters are not zero, sends the error
    report MAC frame. This object is used to set the value of the
    FSECO flag to be used at the next Connect.SMAC event. A write
    operation to this object will not change the operational value
```



```
    reflected in dtrStationOperErrorCountingOption until the next
    Connect.SMAC event."
::= { dtrStationEntry 10 }

dtrStationAdminOpenOption    OBJECT-TYPE
 SYNTAX        INTEGER{ exitToClause4(1), enterBypass(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the action of the Station when a response is
    not received during the registration process.  If set to
    exitToClause4(1), then SMAC attempts to use the TKP access protocol by
    exits to Clause 4. If set to enterBypass(2), then SMAC enters Bypass.
    This object indicates the value of the FSEPO flag to be used at the next
    Connect.SMAC event. A write operation to this object will not change the
    operational value reflected in dtrStationOperOpenOption until the next
    Connect.SMAC event."
::= { dtrStationEntry 11 }

dtrStationAdminRegistrationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ noRegistration (1), dtrRegistration(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies if the Station or C-Port in Station Emulation
    mode registers with the C-Port to request the use of an access protocol
    and a method of phantom drive and wire fault detection. If the value is
    noRegistration(1), then the Station does not register and uses the Join
    FSM defined in Clause 4. If the value is dtrRegistration(2), then the
    Station uses the registration process by using the Join FSM defined in
    9.2. This object indicates the value of the FSREGO flag to be
    used at the next Connect.SMAC event. A write
    operation to this object will not change the operational value
    reflected in dtrStationOperRegistrationOption until the next
    Connect.SMAC event."
::= { dtrStationEntry 12 }

dtrStationAdminRejectRemoveOption    OBJECT-TYPE
 SYNTAX        INTEGER{ removes(1), rejects(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies how the Station responds to a REMOVE
    MAC frame. If set to removes(1), then the SMAC deinserts upon
    receiving a REMOVE MAC frame. If set to rejects(2), then the
    SMAC rejects the REMOVE MAC frame and transmits a Response
    MAC frame indicating function disabled. This object indicates
    the value of the FSRRO flag to be used at the next Connect.SMAC
    event. A write operation to this object will not change the
    operational value reflected in dtrStationOperRejectRemoveOption
    until the next Connect.SMAC event."
::= { dtrStationEntry 13 }

dtrStationAdminMediumRateOption    OBJECT-TYPE
 SYNTAX        INTEGER{ rate4Mbps(1), rate16Mbps(2), rate100Mbps(3),
                        rate1000Mbps(4) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
```

```
    "The value of this object specifies the medium rate as either 4 Mbit/s,
    16 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. If set to rate4Mbps(1), then
    SMAC operates the medium at 4 Mbit/s. If set to rate16Mbps(2), then
    SMAC operates the medium at 16 Mbit/s. If set to rate100Mbps(3), then
    SMAC operates the medium at 100 Mbit/s. If set to rate1000Mbps(4), then
    SMAC operates the medium at 1000 Mbit/s. This object indicates the value
    of the FSMRO flag to be used at the next Connect.SMAC event. A write
    operation to this object will not change the operational value
    reflected in dtrStationOperMediumRateOption until the next
    Connect.SMAC event."
::= { dtrStationEntry 14 }

dtrStationAdminRegistrationQueryOption    OBJECT-TYPE
 SYNTAX        INTEGER{ support(1), ignore(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "The value of this object indicates if the registration query protocol
    is supported by MAC when using the TKP access protocol. If set to
    support(1), then MAC recognizes the Registration Query MAC frame.
    If set to ignore(2), then MAC ignores the Registration Query MAC frame.
    This object indicates the value of FSRQO flag to be used at the next
    Connect.SMAC event. A write operation to this object will not change
    the operational value reflected in dtrStationOperRegistrationQueryOption
    until the next Connect.SMAC event."
::= { dtrStationEntry 15 }

dtrStationAdminRegistrationDeniedOption    OBJECT-TYPE
 SYNTAX        INTEGER{ tkpJoin(1), close(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "The value of this object specifies how the Station acts upon receiving
    a denied registration request. If set to tkpJoin(1), then SMAC attempts
    to Join using the TKP access protocol. If set to close(2), then the SMAC
    closes. This object indicates the value of FSRDO flag to be used
    at the next Connect.SMAC event. A write operation to this object
    will not change the operational value reflected in
    dtrStationOperRegistrationDeniedOption until the next
    Connect.SMAC event."
::= { dtrStationEntry 16 }

dtrStationOperErrorCountingOption    OBJECT-TYPE
 SYNTAX        INTEGER { triggered(1), freeRunning(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies how the MAC manages the error
    report timer.  If set to triggered(1), the MAC resets TSER
    when the first error is received and, when TSER expires,
    transmits a Report Error MAC frame. If set to freeRunning(2),
    each time TSER expires the MAC resets TSER and, if any of the
    error counters are not zero, transmits the Report Error MAC
    frame. This object is used to set the value of the FSECO
    flag at which the Station is currently operating."
::= { dtrStationEntry 17 }

dtrStationOperOpenOption    OBJECT-TYPE
 SYNTAX        INTEGER{ exitToClause4(1), enterBypass(2) }
```



```
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the action of the Station when a response is
    not received during the registration process. If set to exitToClause4(1),
    then SMAC attempts to use the TKP access protocol and exits to Clause 4.
    If set to enterBypass(2), then SMAC enters Bypass. This object indicates
    the value of the FSOPO flag at which the Station is currently
    operating."
::= { dtrStationEntry 18 }

dtrStationOperRegistrationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ noRegistration (1), dtrRegistration(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies if the Station or C-Port in Station Emulation
    mode registers with the C-Port to request the use of an access protocol
    and a method of phantom drive and wire fault detection. If the
    value is noRegistration(1), then the Station does not register and
    uses the Join FSM defined in Clause 4. If the value is
    dtrRegistration(2), then the Station uses the registration process by
    using the Join FSM defined in 9.2. This object indicates the value of
    the FSOPO flag at which the Station is currently operating."
::= { dtrStationEntry 19 }

dtrStationOperRejectRemoveOption    OBJECT-TYPE
 SYNTAX        INTEGER{ removes(1), rejects(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies how the Station responds to a REMOVE
    frame. If set to removes(1), then the SMAC deinserts upon
    receiving a REMOVE MAC frame. If set to rejects(2), then the
    SMAC rejects the REMOVE MAC frame and transmits a Response
    MAC frame indicating function disabled. This object indicates
    the value of the FSRRO flag at which the Station is currently
    operating."
::= { dtrStationEntry 20 }

dtrStationOperMediumRateOption    OBJECT-TYPE
 SYNTAX        INTEGER{ rate4Mbps(1), rate16Mbps(2), rate100Mbps(3),
                        rate1000Mbps(4) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The value of this object specifies the medium rate as either 4 Mbit/s,
    16 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. If set to rate4Mbps(1), then
    SMAC operates the medium at 4 Mbit/s. If set to rate16Mbps(2), then SMAC
    operates the medium at 16 Mbit/s. If set to rate100Mbps(3), then SMAC
    operates the medium at 100 Mbit/s. If set to rate1000Mbps(4), then SMAC
    operates the medium at 1000 Mbit/s. This object indicates the media
    rate at which the Station is currently operating."
::= { dtrStationEntry 21 }

dtrStationOperRegistrationQueryOption    OBJECT-TYPE
 SYNTAX        INTEGER{ support(1), ignore(2) }
 MAX-ACCESS    read-only
 STATUS        current
```

```
 DESCRIPTION
    "The value of this object indicates if the registration query protocol
    is supported by MAC when using the TKP access protocol. If set to
    support(1), then MAC recognizes the Registration Query MAC frame.
    If set to ignore(2), then MAC ignores the Registration Query MAC frame.
    This object indicates the value of FSRQO flag at which the
    Station is currently operating."
::= { dtrStationEntry 22 }

dtrStationOperRegistrationDeniedOption    OBJECT-TYPE
 SYNTAX        INTEGER{ tkpJoin(1), close(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The value of this object specifies how the Station acts upon receiving
    a denied registration request. If set to tkpJoin(1), then SMAC attempts
    to Join using the TKP access protocol. If set to close(2), then the
    SMAC closes. This object indicates the value of FSRDO at which the
    Station is currently operating."
::= { dtrStationEntry 23 }

dtrStationAdminAutoNegotiationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notSupported(1) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "The value of this object specifies what auto negotiation support a
    Station has. When set to notSupported(1), the Station does not support
    auto negotiation. This object indicates the value of FSANO flag to be
    used at the next Connect.SMAC event. A write operation to this object
    will not change the operational value reflected in
    dtrStationOperAutoNegotiationOption until the next Connect.SMAC event."
::= { dtrStationEntry 24 }

dtrStationAdminAbortSequenceOption    OBJECT-TYPE
 SYNTAX        INTEGER{ abortSequence(1), invalidFCS(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the method used by the SMAC to control the ending
    sequence for aborted frames when operating at the high media rate.
    When set to abortSequence(1), a frame is ended with an abort sequence.
    When set to invalidFCS(2), a frame is ended with an invalid FCS and by
    setting the E-bit to 1 in the Ending Delimiter field. This object
    indicates the value of the FSASO flag to be used at the next
    Connect.SMAC event. A write operation to this object will not change the
    operational value reflected in dtrStationOperAbortSequenceOption until
    the next Connect.SMAC event."
::= { dtrStationEntry 25 }

dtrStationAdminHMRTradeUpOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notHMRCapable(1), HMRCapable(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies if the Station is capable of operating at the
    high media rate. When set to notHMRCapable(1), the Station will not
    attempt to register high media rate capability when registering at 4 or
    16 Mbit/s. When set to HMRCapable(2), the Station will register its high
```



```
    media rate capability during registration at 4 or 16 Mbit.s. This object
    indicates the value of the FSHMRTUO flag to be used at the next
    Connect.SMAC event. A write operation to this object will not change the
    operational value reflected in dtrStationOperHMRTradeUpOption until the
    next Connect.SMAC event."
::= { dtrStationEntry 26 }

dtrStationAdminLobeMediaTestOption    OBJECT-TYPE
 SYNTAX        INTEGER{ classicLMT(1), hmrLMT(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
   "This object specifies the lobe media test method employed by the
    Station. When set to classicLMT(1), the Station will employ the lobe
    media test as specified in ISO/IEC 8802-5:1998. When set to hmrLMT(2),
    the Station will employ the two-phase lobe media test as defined in
    9.1.6.2.1. This object indicates the value of the FSLMTO flag to be used
    at the next Connect.SMAC event. A write operation to this object will
    not change the operational value reflected in
    dtrStationOperLobeMediaTestOption until the next Connect.SMAC event."
::= { dtrStationEntry 27 }

dtrStationOperAutoNegotiationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notSupported(1) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The value of this object specifies what auto negotiation support a
    Station has. If set to notSupported(1), the Station does not support
    auto negotiation. This object indicates the value of FSANO at which the
    Station is currently operating."
::= { dtrStationEntry 28 }

dtrStationOperAbortSequenceOption    OBJECT-TYPE
 SYNTAX        INTEGER{ abortSequence(1), invalidFCS(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the method used by the SMAC to control the ending
    sequence for aborted frames when operating at the high media rate.
    If set to abortSequence(1), a frame is ended with an abort sequence. If
    set to invalidFCS(2), a frame is ended with an invalid FCS and by
    setting the E-bit to 1 in the Ending Delimiter field. This object
    indicates the value of FSASO at which the Station is currently
    operating."
::= { dtrStationEntry 29 }

dtrStationOperHMRTradeUpOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notHMRCapable(1), HMRCapable(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies if the Station is capable of operating at the
    high media rate. If set to notHMRCapable(1), the Station will not
    attempt to register high media rate capability when registering at 4 or
    16 Mbit/s. If set to HMRCapable(2), the Station will register its high
    media rate capability during registration at 4 or 16 Mbit/s. This object
    indicates the value of FSHMRTUO at which the Station is currently
    operating."
```

```
::= { dtrStationEntry 30 }

dtrStationOperLobeMediaTestOption    OBJECT-TYPE
 SYNTAX        INTEGER{ classicLMT(1), hmrLMT(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies the lobe media test method employed by the
    Station. If set to classicLMT(1), the Station will employ the lobe media
    test as specified in IEEE Std 8802-5-1998. If set to hmrLMT(2), the
    Station will employ the two phase lobe media test as defined in
    9.1.6.2.1. This object indicates the value of FSLMTO at which the
    Station is currently operating."
::= { dtrStationEntry 31 }

-- ******************************************************
-- C-Port Protocol Characteristics Table
--  This table contains Protocol information for C-Ports (both TKP and TXI).
--  There is an entry in this table for each C-Port in this managed
--  system.
-- ******************************************************

dtrCportTable    OBJECT-TYPE
 SYNTAX        SEQUENCE OF DtrCportEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This table contains information for C-Port interfaces. There is
    one entry in this table for each C-Port interface in a managed
    system."
::= { dtrMacObjects 3 }

dtrCportEntry    OBJECT-TYPE
 SYNTAX        DtrCportEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "A list of characteristics of a C-Port."
 INDEX
    { dtrCportIfIndex }
::= { dtrCportTable 1 }

DtrCportEntry ::= SEQUENCE {
  dtrCportIfIndex                    InterfaceIndex,
  dtrCportCurrentAccessProtocol      INTEGER,
  -- policy variables
  dtrCportAccessProtocolMask         OCTET STRING,
  dtrCportMaxFrameSize               INTEGER,
  dtrCportPhantomDriveMask           OCTET STRING,
  -- policy flags
  dtrCportAdminErrorCountingOption   INTEGER,
  dtrCportAdminMediumRateOption      INTEGER,
  dtrCportAdminOperationOption       INTEGER,
  dtrCportAdminRepeatPathOption      INTEGER,
  dtrCportAdminAbortSequenceOption   INTEGER,
  dtrCportAdminBeaconHandlingOption  INTEGER,
  dtrCportAdminFrameControlOption    INTEGER,

  dtrCportOperErrorCountingOption    INTEGER,
```



```
  dtrCportOperMediumRateOption       INTEGER,
  dtrCportOperOperationOption        INTEGER,
  dtrCportOperRepeatPathOption       INTEGER,
  dtrCportOperAbortSequenceOption    INTEGER,
  dtrCportOperBeaconHandlingOption   INTEGER,
  dtrCportOperFrameControlOption     INTEGER,
  -- HMR policy flags
  dtrCportAdminAutoNegotiationOption INTEGER,
  dtrCportAdminHMRTradeUpOption      INTEGER,

  dtrCportOperAutoNegotiationOption  INTEGER,
  dtrCportOperHMRTradeUpOption       INTEGER
   }

dtrCportIfIndex    OBJECT-TYPE
 SYNTAX        InterfaceIndex
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This object identifies the interface for which this entry contains
    management information. The value of this object for a particular
    interface has the same value as the ifIndex object, defined in RFC 1573,
    for the same interface."
::= { dtrCportEntry 1 }

dtrCportCurrentAccessProtocol    OBJECT-TYPE
 SYNTAX        INTEGER { tKP(1), tXI(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies which access protocol is currently in use by
    the MAC. The value of this object is either (1) TKP or (2) TXI.
    This object cannot be set by management."
::= { dtrCportEntry 2 }

dtrCportAccessProtocolMask    OBJECT-TYPE
 SYNTAX        OCTET STRING(SIZE(2))
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies which access protocols can be supported by the
    PMAC. This object indicates the value of the PPV(AP_MASK)
    The value of this object is either: X'0001' (TKP), X'0002'(TXI),
    or X'0003' (TKPAndTXI)."
::= { dtrCportEntry 3 }

dtrCportMaxFrameSize    OBJECT-TYPE
 SYNTAX        INTEGER(133..18211)
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies the maximum frame size that a PMAC
    will transmit and indicates the value of the PPV(MAX_TX) variable.
    At 4 Mbit/s, the maximum permitted value is 4550. At 16 Mbit/s, the
    maximum permitted value is 18 200. At 100 Mbit/s, the maximum permitted
    value is 18 207. At 1000 Mbit/s, the maximum permitted value is 18 211."
::= { dtrCportEntry 4 }

dtrCportPhantomDriveMask    OBJECT-TYPE
```

```
 SYNTAX        OCTET STRING (SIZE(2))
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The object indicates the value of the C-Port policy variable
    PPV(PD_MASK). It represents a bit mask of phantom drive and wire fault
    detection methods supported by the C-Port."
::= { dtrCportEntry 5 }

dtrCportAdminErrorCountingOption    OBJECT-TYPE
 SYNTAX        INTEGER { triggered(1), freeRunning(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies how the MAC manages the error report timer.
    If set to triggered(1), the MAC resets TPER when the first error is
    received and, when TPER expires, transmits the Report Error PMAC frame.
    If set to  freeRunning(2), each time TPER expires the PMAC resets TPER
    and, if any of the error counters are not zero, transmits theReport
    Error MAC frame. This object indicates the value of the FPECO flag.
    A write operation to this object will not change the operational
    value reflected in dtrCportOperErrorCountingOption until the
    next Connect.PMAC event."
::= { dtrCportEntry 6 }

dtrCportAdminMediumRateOption    OBJECT-TYPE
 SYNTAX        INTEGER{ rate4Mbps(1), rate16Mbps(2), rate100Mbps(3),
                        rate1000Mbps(4) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "The value of this object specifies the medium rate as either 4 Mbit/s,
    16 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. If set to rate4Mbps(1), then
    PMAC operates the medium at 4 Mbit/s. If set to rate16Mbps(2), then PMAC
    operates the medium at 16 Mbit/s. If set to rate100Mbps(3), then PMAC
    operates the medium at 100 Mbit/s. If set to rate1000Mbps(4), then PMAC
    operates the medium at 1000 Mbit/s. The PMAC uses this object to set the
    value of the FPMRO flag to be used at the next Connect.PMAC event. A
    write operation to this object will not change the operational value
    reflected in dtrCportOperMediumRateOption until the next Connect.PMAC
    event."
::= { dtrCportEntry 7 }

dtrCportAdminOperationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ portMode(1), StationEmulationMode(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies whether the C-Port is in Port mode or Station
    Emulation mode. If set to portMode(1), then PMAC is operating in the
    Port mode. If set to StationEmulationMode(2), then PMAC is operating
    in the Station Emulation mode. This object indicates the value of the
    FPOTO flag to be used at the next Connect.PMAC event. A write
    operation to this object will not change the operational
    value reflected in dtrCportOperOperationOption until the next
    Connect.PMAC event."
::= { dtrCportEntry 8 }

dtrCportAdminRepeatPathOption    OBJECT-TYPE
```



```
 SYNTAX        INTEGER{ repeatsACBits (1), setsACBits(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "When this object is set to repeatsACBits(1), the C-Port repeat path
    will not set the A- and C-bits to 1, when an address is
    recognized by the C-Port. When set to setsACBits(2), the C-Port repeat
    path will set the A bit to 1 when a destination address is recognized
    by the C-Port and the C-bit to 1 if the frame is copied. This object
    indicates the value of the FPACO flag to be used at the next
    Connect.PMAC event. A write operation to this object will not change the
    Operational value reflected in dtrCportOperRepeatPathOption until the
    next Connect.PMAC event."
::= { dtrCportEntry 9 }

dtrCportAdminAbortSequenceOption    OBJECT-TYPE
 SYNTAX        INTEGER{ abortSequence (1), invalidFCS(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "At 4 and 16 Mbit/s, this object specifies the method used by the PMAC
    to control the ending sequence for over-length frames when a cut-through
    design is supported. When set to abortSequence(1), an over-length frame
    is ended with an abort sequence. When set to invalidFCS(2), an over-
    length frame is ended with an invalid FCS and by setting the E-bit to 1
    in the Ending Delimiter field. At high media rate, this object specifies
    the method used by the PMAC to control the ending sequence for aborted
    frames. When set to abortSequence(1), a frame is ended with an abort
    sequence. When set to invalidFCS(2), a frame is ended with an invalid
    FCS and by setting the E-bit to 1 in the Ending Delimiter field. This
    object indicates the value of the FPASO flag to be used at the next
    Connect.PMAC event. A write operation to
    this object will not change the operational value reflected in
    dtrCportOperAbortSequenceOption until the next Connect.PMAC event."
::= { dtrCportEntry 10 }

dtrCportAdminBeaconHandlingOption    OBJECT-TYPE
 SYNTAX        INTEGER{
                    afterNeighborNotification(1),
                    atJoinCompleteStateEntry(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object indicates how a PMAC participates in the beaconing process
    prior to the C-Port completing the joining process while operating in
    the TKP access protocol.  If set to afterNeighborNotification(1), then the
    beacon process operates when Neighbor Notification completes. If set
    to atJoinCompleteStateEntry(2), then the beacon process operates when
    PMAC has completed Join. This object indicates the value of the FPBHO
    flag to be used at the next Connect.PMAC event. A write operation to
    this  object will not change the operational value reflected in
    dtrCportOperBeaconHandlingOption until the next Connect.PMAC event."
::= { dtrCportEntry 11 }

dtrCportAdminFrameControlOption    OBJECT-TYPE
 SYNTAX        INTEGER{ fr_FC(1), fr(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
```

```
    "This object indicates the value of the FPFCO flag, which is used to
    control the forwarding of frames to the DTU interface. If set to
    fr_FC(1), then PMAC causes the received FR_FC event to be indicated to
    the DTU. If set to fr(2), then PMAC cause the received FR event to be
    indicated to the DTU. This object specifies the value of the FPFCO flag
    to be used at the next Connect.PMAC event. A write operation to this
    object will not change the operational value reflected in
    dtrCportOperFrameControlOption until the next Connect.PMAC event."
::= { dtrCportEntry 12 }

dtrCportOperErrorCountingOption    OBJECT-TYPE
 SYNTAX        INTEGER{ triggered(1), freeRunning(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies how the MAC manages the error report timer.
    This object indicates the value of the FPECO flag. If set to
    triggered(1), the MAC resets TPER when the first error is received and,
    when TPER expires, transmits a Report Error MAC frame. If set to
    freeRunning(2), each    time TPER expires the MAC resets TPER and, if
    any of the error counters are    not zero, transmits the Report Error
    MAC frame. This object indicates the    value of the FPECO flag at which
    the C-Port is currently operating."
::= { dtrCportEntry 13 }

dtrCportOperMediumRateOption    OBJECT-TYPE
 SYNTAX        INTEGER{ rate4Mbps(1), rate16Mbps(2), rate100Mbps(3),
                        rate1000Mbps(4) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The value of this object specifies the medium rate as either 4 Mbit/s,
    16 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. If set to rate4Mbps(1), then
    PMAC operates the medium at 4 Mbit/s. If set to rate16Mbps(2), then PMAC
    operates the medium at 16 Mbit/s. If set to rate100Mbps(3), then PMAC
    operates the medium at 100 Mbit/s. If set to rate1000Mbps(4), then PMAC
    operates the medium at 1000 Mbit/s. The PMAC uses this object during a
    MGT_ACTION.request(OPEN). This object specifies the value at which the
    C-Port is currently operating."
::= { dtrCportEntry 14 }

dtrCportOperOperationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ portMode(1), StationEmulationMode(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies whether the C-Port is in Port mode or Station
    Emulation mode. If set to portMode(1), then PMAC is operating in the
    Port mode. If set to StationEmulationMode(2), then PMAC is operating
    in the Station Emulation mode. This object indicates the value of the
    FPOTO flag at which the C-Port is currently operating."
::= { dtrCportEntry 15 }

dtrCportOperRepeatPathOption    OBJECT-TYPE
 SYNTAX        INTEGER{ repeatsACBits (1), setsACBits(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "When this object is set to repeatsACBits(1), the C-Port repeat path
```



```
    will not set the A- and C-bits to 1 when an address is recognized by
    by the C-Port. When set to setsACBits(2), the C-Port repeat
    path will set the A-bit to 1 when a destination address is recognized
    by the C-Port and the C-bit to 1 if the frame is copied. This object
    indicates the value of the FPACO flag at which the C-Port is
    currently operating."
::= { dtrCportEntry 16 }

dtrCportOperAbortSequenceOption    OBJECT-TYPE
 SYNTAX        INTEGER{ abortSequence(1), invalidFCS(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "At 4 and 16 Mbit/s, this object specifies the method used by the PMAC
    to control the ending sequence for over-length frames when a frame of
    unknown length is supported. When set to abortSequence(1), an over-
    length frame is ended with an abort sequence. When set to
    invalidFCS(2), an over-length frame is ended with an invalid FCS and by
    setting the Error Detected bit in the Ending Delimiter field. At high
    media rate, this object specifies the method used by the PMAC to control
    the ending sequence for aborted frames. If set to abortSequence(1), a
    frame is ended with an abort sequence. If set to invalidFCS(2), a frame
    is ended with an invalid FCS and by setting the E-bit to 1 in the Ending
    Delimiter field. This object indicates the value of the FPASO flag at
    which the C-Port is currently operating."
::= { dtrCportEntry 17 }

dtrCportOperBeaconHandlingOption    OBJECT-TYPE
 SYNTAX        INTEGER{
                    afterNeighborNotification(1),
                    atJoinCompleteStateEntry(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object indicates how a PMAC participates in the beaconing process
    prior to the C-Port completing the joining process while operating in the
    TKP access protocol.  If set to afterNeighborNotification(1), then
    beacon process operates when Neighbor Notification completes. If set
    to atJoinCompleteStateEntry(2), then the beacon process operates when
    PMAC has completed Join. This object indicates the value of the FPBHO
    flag at which the C-Port is currently operating."
::= { dtrCportEntry 18 }

dtrCportOperFrameControlOption    OBJECT-TYPE
 SYNTAX        INTEGER{ fr_FC(1), fr(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object indicates the value of the FPFCO flag that is used to
    control the forwarding of frames to the DTU interface. If set to fr_FC(1),
    then PMAC causes the received FR_FC event to be indicated to the DTU.
    If set to fr(2), then PMAC causes the received FR event to be indicated to
    the DTU. This object indicates the value of the FPFCO flag at which the
    C-Port is currently operating."
::= { dtrCportEntry 19 }

dtrCportAdminAutoNegotiationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notSupported(1) }
 MAX-ACCESS    read-write
```

```
 STATUS        current
 DESCRIPTION
    "The value of this object specifies what auto negotiation support a C-Port
    has. When set to notSupported(1), the C-Port does not support auto
    negotiation. This object indicates the value of FPANO flag to be used at
    the next Connect.PMAC event. A write operation to this object will not
    change the operational value reflected in
    dtrCportOperAutoNegotiationOption until the next Connect.PMAC event."
::= { dtrCportEntry 20 }

dtrCportAdminHMRTradeUpOption    OBJECT-TYPE
 SYNTAX        INTEGER{ disableHMRTradeUp(1), enableHMRTradeUp(2) }
 MAX-ACCESS    read-write
 STATUS        current
 DESCRIPTION
    "This object specifies if the C-Port allows a trade-up to the high media
    rate duiring registration. When set to disableHMRTradeUp(1), the C-Port
    will deny a Stations's request to trade-up. When set to
    enableHMRTradeUp(2), the C-Port will accept a Stations's request to trade-
    up. This object indicates the value of the FPHMRTUO flag to be used at the
    next Connect.PMAC event. A write operation to this object will not change
    the operational value reflected in dtrCportOperHMRTradeUpOption until the
    next Connect.PMAC event."
::= { dtrCportEntry 21 }

dtrCportOperAutoNegotiationOption    OBJECT-TYPE
 SYNTAX        INTEGER{ notSupported(1) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "The value of this object specifies what auto negotiation support a C-Port
    has. If set to notSupported(1), the C-Port does not support auto
    negotiation. This object indicates the value of FPANO at which the
    C-Port is currently operating."
::= { dtrCportEntry 22 }

dtrCportOperHMRTradeUpOption    OBJECT-TYPE
 SYNTAX        INTEGER{ disableHMRTradeUp(1), enableHMRTradeUp(2) }
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object specifies if the C-Port allows a trade-up to the high media
    rate duiring registration. If set to disableHMRTradeUp(1), the C-Port will
    deny a Stations's request to trade-up. If set to enableHMRTradeUp(2), the
    C-Port will accept a Stations's request to trade-up. This object indicates
    the value of FPHMRTUO at which the C-Port is currently operating."
::= { dtrCportEntry 23 }

-- ******************************************************
-- TXI Statistics
--  This table contains statistics for TXI MACs. There
--  is one entry in this table for each TXI MAC in
--  a managed system.
-- ******************************************************

txiStatisticsTable    OBJECT-TYPE
 SYNTAX        SEQUENCE OF TxiStatisticsEntry
 MAX-ACCESS    not-accessible
 STATUS        current
```



```
 DESCRIPTION
  "This table contains statistics for each TXI MAC in a managed system."
::= { dtrMacObjects 4 }

txiStatisticsEntry    OBJECT-TYPE
 SYNTAX        TxiStatisticsEntry
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
  "A list of statistics"
 INDEX
    { txiStatsIfIndex }
::= { txiStatisticsTable 1 }

TxiStatisticsEntry ::= SEQUENCE {
  txiStatsIfIndex                    InterfaceIndex,
  txiStatsAbortErrorCounter          Counter32,
  txiStatsBurstErrorCounter          Counter32,
  txiStatsInternalErrorCounter       Counter32,
  txiStatsLineErrorCounter           Counter32,
  txiStatsFrequencyErrorCounter      Counter32,
  txiStatsRcvCongestionErrorCounter  Counter32,
  txiStatsOverlengthFrameCounter     Counter32
  txiStatsTimeStamp                  TimeStamp }

txiStatsIfIndex    OBJECT-TYPE
 SYNTAX        InterfaceIndex
 MAX-ACCESS    not-accessible
 STATUS        current
 DESCRIPTION
    "This object identifies the interface for which this entry contains
    management information. The value of this object for a particular
    interface has the same value as the ifIndex object, defined in RFC 1573,
    for the same interface."
::= { txiStatisticsEntry 1 }

txiStatsAbortErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when the PMAC or SMAC prematurely ends
    a transmission by transmitting an abort sequence. A Network Management
    Station can detect discontinuities in this counter by monitoring the
    txiStatsTimeStamp object."
::= { txiStatisticsEntry 2 }

txiStatsBurstErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when a PMAC or SMAC detects the absence
    of transitions at the receiver input. The counter is only required to be
    incremented once during each interval of signal disruption. The counter
    may be inhibited after a burst5_error has been indicated until an event
    occurs that indicates the MAC is receiving a valid signal. A MAC may
    count every burst5_error. A Network Management Station can detect
    discontinuities in this counter by monitoring the txiStatsTimeStamp object."
```

```
 REFERENCE "Subclause 5.4.2 in IEEE Std 8802-5-1998"
::= { txiStatisticsEntry 3 }

txiStatsInternalErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when the MAC recognizes a recoverable
    internal error. A Network Management Station can detect discontinuities in
    this counter by monitoring the txiStatsTimeStamp object."
::= { txiStatisticsEntry 4 }

txiStatsLineErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when a frame with error
    (FR_WITH_ERR) is received by the Station or C-Port.
    A Network Management Station can detect discontinuities
    in this counter by monitoring the txiStatsTimeStamp object."
 REFERENCE "Subclause 4.3.2 in IEEE Std 8802-5-1998"
::= { txiStatisticsEntry 5 }

txiStatsFrequencyErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when a frequency error is indicated
    by the Station or C-Port PHY. A Network Management
    Station can detect discontinuities in this counter by monitoring the
    txiStatsTimeStamp object."
 REFERENCE "Subclause 5.7.2 in IEEE Std 8802-5-1998"
::= { txiStatisticsEntry 6 }

txiStatsRcvCongestionErrorCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when a frame addressed to the MAC is
    not copied. A Network Management Station can detect discontinuities
    in this counter by monitoring the txiStatsTimeStamp object."
::= { txiStatisticsEntry 7 }

txiStatsOverlengthFrameCounter    OBJECT-TYPE
 SYNTAX        Counter32
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This counter is incremented when the PMAC prematurely
    ends a transmission due to an overlength frame. The
    value of this counter is 0 for SMACs. A Network Management
    Station can detect discontinuities in this counter by monitoring the
    txiStatsTimeStamp object."
::= { txiStatisticsEntry 8 }
```



```
txiStatsTimeStamp    OBJECT-TYPE
 SYNTAX        TimeStamp
 MAX-ACCESS    read-only
 STATUS        current
 DESCRIPTION
    "This object indicates the time of the last discontinuity. Counters
    have defined initial value, and thus, a single value of a counter has
    no information content. Discontinuities on the monotonically increasing
    value can occur at reinitialization and possibly at other times. This
    time-stamp indicates to a management Station that some discontinuity
    in counting has occurred."
::= (txiStatisticsEntry 9}

-- Traps

dtrMacNonOperational    NOTIFICATION-TYPE

 OBJECTS{
                   txiProtocolEventStatus,
                   txiProtocolBeaconSA,
                   txiProtocolBeaconType,
                   txiProtocolBeaconUNA,
                   txiProtocolBeaconPDN }
 STATUS       current
 DESCRIPTION
    "This notification indicates the Station or C-Port is in
    a nonoperational state. If the eventStatus is
    heartBeatLost or signalLoss, the value in the beacon
    objects represent those of the last transmitted Beacon
    MAC frame. If the eventStatus is beaconReceived, the
    values in the beacon objects represent those contained
    in the last received Beacon MAC frame."
::= { dtrMacTraps 1}

dtrMacFailure    NOTIFICATION-TYPE
 OBJECTS{ txiProtocolEventStatus }
 STATUS       current
 DESCRIPTION
    "This notification indicates that a fault has occurred,
    causing the Station to return to the Bypass state. This trap is
    sent if eventStatus is remove, internalError, StationorCPortError,
    or wireFault."
::= { dtrMacTraps 2}

dtrMacProtocolFailure    NOTIFICATION-TYPE
 OBJECTS{ txiProtocolEventStatus }
 STATUS        current
 DESCRIPTION
    "This notification indicates the PMAC or SMAC using the
    TXI access protocol detected a MAC frame that is only used by the
    TKP access protocol."
::= { dtrMacTraps 3}

-- Conformance Statement

-- ************************************************************************
-- Conformance information
-- ************************************************************************
```

```
dtrMacCompliances  OBJECT IDENTIFIER ::= { dtrMacConformance 1 }
dtrMacGroups       OBJECT IDENTIFIER ::= { dtrMacConformance 2 }

-- Compliance statements
dtrMacCompliance    MODULE-COMPLIANCE
 STATUS       current
 DESCRIPTION
    "The compliance statement for the SNMPv2 entities that implement
    the dtrMacMIB."
 MODULE  -- this module

  GROUP       txiProtocolGroup
  DESCRIPTION
    "The txiProtocolGroup is mandatory for those DTR MAC entities that
    implement the TXI protocol."

GROUP        dtrStationGroup
  DESCRIPTION
    "The dtrStationGroup is optional."

GROUP        dtrCportGroup
  DESCRIPTION
    "The dtrCportGroup is optional."

GROUP        dtrMacNotificationsGroup
  DESCRIPTION
    "The dtrMacNotificationGroup is optional."

OBJECT         txiProtocolFunctionalAddress
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAccessProtocolMask
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationIndividualAddressCount
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationMaxFrameSize
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminErrorCountingOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminOpenOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminRegistrationOption
```



```
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminRejectRemoveOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminMediumRateOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminRegistrationQueryOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminRegistrationDeniedOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminAutoNegiotiationOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminAbortSequenceOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminHMRTradeUpOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrStationAdminLobeMediaTestOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAccessProtocolMask
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportMaxFrameSize
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminErrorCountingOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."
```

```
OBJECT         dtrCportAdminOperationOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminRepeatPathOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminAbortSequenceOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminBeaconHandlingOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminFrameControlOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT         dtrCportAdminAutoNegotiationOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

OBJECT       dtrCportAdminHMRTradeUpOption
  MIN-ACCESS   read-only
  DESCRIPTION
    "Write access is not required."

::= {dtrMacCompliances 1}

-- Group definitions

txiProtocolGroup    OBJECT-GROUP
 OBJECTS{
                    txiProtocolMacType,
                    txiProtocolFunctionalAddress,
                    txiProtocolUpstreamNeighborAddress,
                    txiProtocolMicrocodeLevel,
                    txiProtocolProductInstanceId,
                    txiProtocolAuthorizedFunctionClasses,
                    txiProtocolErrorReportTimer,
                    txiProtocolPhysicalDropNumber,
                    txiProtocolRingNumber,
                    txiProtocolRingStatus,
                    txiProtocolJoinState,
                    txiProtocolMonitorState,
                    txiProtocolBeaconSA,
                    txiProtocolBeaconType,
                    txiProtocolBeaconPDN,
                    txiProtocolBeaconUNA,
                    txiProtocolEventStatus }
 STATUS         current
```



```
 DESCRIPTION
    "A collection of objects providing information for IEEE Std 802.5-1999 TXI
    interface."
::= { dtrMacGroups 1}

dtrCportGroup    OBJECT-GROUP
 OBJECTS{
                    dtrCportCurrentAccessProtocol,
                    dtrCportAccessProtocolMask,
                    dtrCportMaxFrameSize,
                    dtrCportPhantomDriveMask,
                    dtrCportAdminErrorCountingOption,
                    dtrCportAdminMediumRateOption,
                    dtrCportAdminOperationOption,
                    dtrCportAdminRepeatPathOption,
                    dtrCportAdminAbortSequenceOption,
                    dtrCportAdminBeaconHandlingOption,
                    dtrCportAdminFrameControlOption,
                    dtrCportOperErrorCountingOption,
                    dtrCportOperMediumRateOption,
                    dtrCportOperOperationOption,
                    dtrCportOperRepeatPathOption,
                    dtrCportOperAbortSequenceOption,
                    dtrCportOperBeaconHandlingOption,
                    dtrCportOperFrameControlOption,
                    dtrCportAdminAutoNegotiationOption,
                    dtrCportAdminHMRTradeUpOption,
                    dtrCportOperAutoNegotiationOption,
                    dtrCportOperHMRTradeUpOption }
 STATUS        current
 DESCRIPTION
    "A collection of objects providing protocol characteristics of
    for a DTR C-Port."
::= { dtrMacGroups 2 }

dtrStationGroup    OBJECT-GROUP
 OBJECTS{
                    dtrStationStationType,
                    dtrStationCurrentAccessProtocol,
                    dtrStationRequestedAccessProtocol,
                    dtrStationAccessProtocolResponse,
                    dtrStationAccessProtocolMask,
                    dtrStationIndividualAddressCount,
                    dtrStationMaxFrameSize,
                    dtrStationPhantomDriveSupport,
                    dtrStationAdminErrorCountingOption,
                    dtrStationAdminOpenOption,
                    dtrStationAdminRegistrationOption,
                    dtrStationAdminRejectRemoveOption,
                    dtrStationAdminMediumRateOption,
                    dtrStationAdminRegistrationQueryOption,
                    dtrStationAdminRegistrationDeniedOption,
                    dtrStationOperErrorCountingOption,
                    dtrStationOperOpenOption,
                    dtrStationOperRegistrationOption,
                    dtrStationOperRejectRemoveOption,
                    dtrStationOperMediumRateOption,
                    dtrStationOperRegistrationQueryOption,
                    dtrStationOperRegistrationDeniedOption,
```

```
                    dtrStationAdminAutoNegotiationOption,
                    dtrStationAdminAbortSequenceOption,
                    dtrStationAdminHMRTradeUpOption,
                    dtrStationAdminLobeMediaTestOption,
                    dtrStationOperAutoNegotiationOption,
                    dtrStationOperAbortSequenceOption,
                    dtrStationOperHMRTradeUpOption,
                    dtrStationOperLobeMediaTestOption }
 STATUS         current
 DESCRIPTION
    "A collection of objects providing protocol characteristics of
    a DTR Station."
::= { dtrMacGroups 3 }

txiStatisticsGroup    OBJECT-GROUP
 OBJECTS{
                    txiStatsAbortErrorCounter,
                    txiStatsBurstErrorCounter,
                    txiStatsInternalErrorCounter,
                    txiStatsLineErrorCounter,
                    txiStatsFrequencyErrorCounter,
                    txiStatsRcvCongestionErrorCounter,
                    txiStatsOverlengthFrameCounter,
                    txiStatsTimeStamp }
 STATUS         current
 DESCRIPTION
    "A collection of objects providing statistics for 802.5 TXI
    interfaces."
::= { dtrMacGroups 4 }

dtrMacNotificationGroup    NOTIFICATION-GROUP
 NOTIFICATIONS{
                    dtrMacNonOperational,
                    dtrMacFailure,
                    dtrMacProtocolFailure }
 STATUS         current
 DESCRIPTION
    "DTR MAC notifications."
::= {dtrMacGroups 5 }
```

13. Fiber optic media

Insert new 13.10:

13.10 1000 Mbit/s Physical Medium Components

This subclause defines the physical medium components (PMC) of the fibre optic Station and C-Port attachment PHY layer to be used for 1000 Mbit/s transmission.

13.10.1 Fibre-Optic Media Dependent Specifications (PMC-LX and PMC-SX)

The PMC-LX is composed of and shall meet all requirements of the 1000BASE-LX PMD defined within [802.3], Clause 38 with the following exceptions.

The PMC-SX is composed of and shall meet all requirements of the 1000BASE-SX PMD defined within [802.3], Clause 38 with the following exceptions.

Where there is conflict between specifications in [802.3] and in this standard, those of this standard shall prevail.

13.10.1.1 Service Specifications

The PMA service primitives defined in [802.3], subclauses 38.1 and 38.2 are replaced by the ANSI/IEEE Std 802.5-1998 service primitives as defined in 9.8.2.2.

13.10.1.2 MDI

Optical fibre connectors shall meet or exceed the performance specification of ISO/IEC 11801 for the duplex SC connector MDI of [802.3], Clause 38, and have a corresponding ISO/IEC 61754 or ANSI/TIA/EIA-604 intermateability standard. These include, but are not limited to, the small form factor connector types specified in Annex AB.

13.10.1.3 Crossover Function

A crossover function shall be implemented in every fibre-optic cable-pair link. The crossover function connects the transmitter of one PHY to the receiver of the PHY at the other end of the cable-pair link. For implementations using either the 1000BASE-LX or 1000BASE-SX PMD, the crossover function for fibre attachment is realized in the cable plant.

13.10.1.4 Full Duplex Capability

The Physical Layer device shall support Full Duplex transmission.

Replace Clause 14 with the following:

14. Formats and facilities for high media rate

This clause defines the new Sequence Definitions (14.1) and Field Descriptions (14.2) used for high media rate operation. The clause also notes the changes from Clauses 3 and 10 to MAC frames (14.3), System Timers (14.4), and Policy Flags and Variables (14.5) when used for high media rate operation.

14.1 Sequence definitions

This subclause defines the Frame, Abort, Token, and Fill sequences for high media rate operation. The sequences are defined as a series of fields. There are two types of field: media encoding dependent and media encoding independent. Media encoding dependent fields are shown with shading and their precise length and definition is shown in 14.2.2. Media encoding independent fields are composed of octets, and are shown without shading and with octet counts.

14.1.1 Frame Sequence

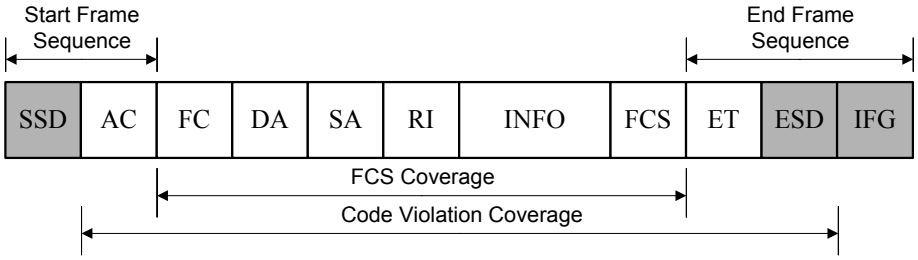


Figure 14-1—Frame Sequence

Field Abbr.	Field Name	Ref.	Field Length (octets)
SSD	Start-of-Sequence Delimiter	14.2.2	media dependant
AC	Access Control	10.2.1	1
FC	Frame Control	3.2.3	1
DA	Destination Address	3.2.4.1	6
SA	Source Address	3.2.4.2	6
RI	Routing Information	3.2.5	0 to 30
INFO	Information	3.2.6	0 or more
FCS	Frame Check Sequence	3.2.7	4
ET	End Transmit	14.2.1.1	1
ESD	End-of-Sequence Delimiter	14.2.2	media dependant
IFG	Interframe Gap	14.2.2	media dependant

The frame sequence shall be used for transmitting both MAC and LLC messages to the destination entities. It may or may not contain an information (INFO) field. It may or may not contain a routing information (RI) field. The frame sequence may occur anywhere in the data stream. Receiving entities shall be able to detect a frame on any signal element boundary.

14.1.2 Abort Sequence

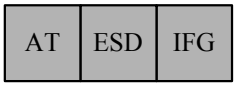


Figure 14-2—Abort Sequence

Field Abbr.	Field Name	Ref.	Field Length (octets)
AT	Abort Transmit	14.2.2	media dependant
ESD	End-of-Sequence Delimiter	14.2.2	media dependant
IFG	Interframe Gap	14.2.2	media dependant

The abort sequence is transmitted by an entity when it prematurely terminates a frame's transmission. An abort sequence shall be transmitted on an octet boundary, but may optionally be transmitted on any nibble boundary in the case of a STATION_ERR or a PORT_ERR.

An implementation shall be capable of receiving an abort sequence on any octet boundary. An implementation may optionally count a frame received with an abort sequence on a nonoctet boundary as a line error. The abort sequence causes the receiving entity to recognize that the frame being received is not a valid frame.

14.1.3 Fill Sequence

Figure 14-3—Fill Sequence

Field Abbr.	Field Name	Ref.	Field Length (octets)
FILL	Fill	14.2.2	media dependant

An entity shall transmit the fill sequence in accordance with the protocol described in Clause 9.

14.2 Field descriptions

14.2.1 Media Encoding Independent Field Descriptions

The following is a detailed description of the individual fields used in frame, token, abort and fill sequences, where they differ from Classic Token Ring and Dedicated Token Ring as defined in IEEE Std 8802-5-1998).

14.2.1.1 End Transmit (ET)

14.2.1.1.1 End Transmit for Frame Sequence using TXI Access Protocol

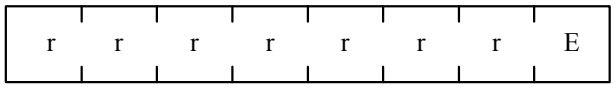


Figure 14-4—End Transmit Field Bits — TXI

Field Abbr.	Field Name	Field Length (bits)
E	Error	1
r	reserved	1

14.2.1.1.1.1 Error (E) Bit

The E-bit shall be transmitted as 0 by the entity when it originates the frame sequence, except when the entity is aborting the transmission of the frame, and the abort option FxASO is set to 1. Then the E-bit shall be transmitted as 1. All entities check frame sequences for errors. When a frame with error is detected and the received E-bit is equal to 0 the frame is counted as a line error.

14.2.1.1.1.2 Reserved (r) Bits

The reserved bits are reserved for future standardization. They shall be transmitted as 0 and ignored on receipt.

14.2.2 Media Encoding Dependent Field Descriptions

The following is a detailed description of the media encoding dependent fields used in frame, token, abort, and fill sequences.

14.2.2.1 100 Mbit/s PSC Operation

These are the field definitions for SSD, AT, ESD, IFG, and FILL used during 100 Mbit/s PSC operation.

14.2.2.1.1 Start-of-Sequence Delimiter (SSD)

The SSD is composed of the two code-groups /J/K/.

14.2.2.1.2 Abort Transmit (AT)

The AT is composed of the two code-groups /H/H/.

14.2.2.1.3 End-of-Sequence Delimiter (ESD)

The ESD is composed of the two code-groups /T/R/.

14.2.2.1.4 Interframe Gap (IFG)

The IFG is composed of /I/ code-groups. For TXI Access Protocol operation, the IFG shall be transmitted on the wire as a minimum of 24 /I/ code-groups. Note that if an MII device is being employed, then a minimum of 26 code-groups are required at the MII interface to satisfy the IFG requirement, as the first two code-groups on the interface are converted into the End-of-Sequence Delimiter, /T/R/, by the MII device. Also note that FILL may follow the IFG.

14.2.2.1.5 Fill (FILL)

The FILL is composed of 0 or more /I/ code-groups.

14.2.2.2 1000 Mbit/s PSC-X Operation

These are the field definitions for SSD, AT, ESD, IFG, and FILL used during PSC-X operation. The code-groups used for the PSC-X are defined in 9.8.2.3.1.

14.2.2.2.1 Start-of-Sequence Delimiter (SSD)

As defined in [802.3], subclause 35.2.3.2, at the start of a frame transmission the sequence of octets presented at the GMII shall consist of <7***p***><**sfd**> where

p comprises one octet with the following bit values: 10101010

sfd comprises one octet with the following bit values: 10101011

The action of the PSC-X is such that upon each fresh assertion of TX_EN at the GMII, and subsequent to the completion of transmission of the current ordered_set, the PSC-X replaces the current octet of the preamble with /S/.

Therefore, if TX_EN is asserted on an ordered set boundary, the transmitted SSD pattern at the medium shall be

/S/<6***p***><**sfd**>

and if TX_EN is asserted in the middle of an ordered set then the transmitted SSD pattern at the medium shall be

/S/<5***p***><**sfd**>

Upon initiation of packet reception, the PSC-X replaces the received /S/ delimiter with the data octet value associated with the first preamble octet.

To allow for the preamble shrinkage and symbol translation as defined in [802.3], subclause 35.2.3.2.2, on reception, the MAC shall recognise <**n***p**><**sfd**> as SSD, where 0≤**n**≤7.

14.2.2.2.2Abort Transmit (AT)

The AT is composed of the two code-groups /V/V/.

14.2.2.2.3 End-of-Sequence Delimiter (ESD)

The ESD starts with the two code-groups /T/R/. An additional /R/ code-group may be appended (making the ESD /T/R/R/) as described in [802.3], Clause 36 to ensure that the subsequent IFG idle code-group starts word aligned.

14.2.2.2.4 Interframe Gap (IFG)

Code-group alignment on word boundaries is guaranteed by the variable length of the preceding ESD. IFG is composed of a minimum of 5 /I/ code-groups.

The first /I/ following the ESD may be either an /I1/ or an /I2/ depending upon the rules of [802.3], Clause 36. Subsequent /I/ code-groups within the same IFG shall all be /I2/ types.

Note that FILL may follow the IFG.

14.2.2.2.5 Fill (FILL)

The FILL is composed of 0 or more /I2/ code-groups.

14.2.2.3 1000 Mbit/s PSC-T Operation

These are the field definitions for SSD, AT, ESD, IFG, and FILL used during PSC-T operation. They are defined in terms of [802.3] "conditions." The conditions and corresponding quinary-symbol vectors used by the PSC-T are defined in 9.8.2.3.2.

14.2.2.3.1 Start-of-Sequence Delimiter (SSD)

As defined in [802.3], subclause 35.2.3.2, at the start of a frame transmission the sequence of octets presented at the GMII shall consist of <7***p*><*sfd*> where

p comprises one octet with the following bit values: 10101010

sfd comprises one octet with the following bit values: 10101011

The action of the PSC-T is such that upon each fresh assertion of TX_EN at the GMII, the PSC-T replaces the first two preamble octets with two consecutive vectors of four quinary symbols.

Therefore, SSD is composed of the two quinary-symbol vector sequence represented by a SSD1 condition followed by an SSD2 condition.

To allow for the preamble shrinkage and symbol translation as defined in [802.3], subclause 35.2.3.2.2, on reception, the MAC shall recognise <***n****p*><*sfd*> as SSD, where 0≤***n***≤7.

14.2.2.3.2 Abort Transmit (AT)

The AT is composed of the sequence represented by two consecutive quinary-symbol vectors which represent the xmt_err condition.

14.2.2.3.3 End-of-Sequence Delimiter (ESD)

The ESD is composed of the sequence of quinary-symbol vectors represented by two CSReset conditions followed by an ESD1 and then an ESD2_Ext_0 condition.

14.2.2.3.4 Interframe Gap (IFG)

The IFG is composed of a minimum of 12 consecutive quinary-symbol vectors representing the Idle/Carrier-Extension condition. Note that FILL may follow the IFG.

14.2.2.3.5 Fill (FILL)

The FILL is composed of 0 or more symbol-vectors representing the Idle/CarrierExtension condition.

14.3 Medium Access Control (MAC) frames

This subclause defines the new and modified MAC frame vector and subvectors used at High Media Rate operation, where they differ from Clauses 3 and 10 (IEEE Std 8802-5-1998).

14.3.1 Vector Descriptions

14.3.1.1 X'08'-Lobe Media Test (TEST)

The Lobe Media Test MAC frame is used in the test to determine whether the lobe between the Station and the C-Port has an acceptable BER as defined in Annex P. At the high media rate, the Lobe Media Test is defined as consisting of 1120 TEST frames, each frame 112 octets long including the FCS. The Lobe Media Test MAC frame shall not contain a RI field. These requirements fix the length of the X'26' Wrap Data subvector to be 90 octets.

14.3.1.2 X'16'-Lobe Media Test Notification (LMTN)

The Lobe Media Test Notification MAC frame is used by Stations to indicate to C-Ports that they are ready to perform the Lobe Media Test. On receipt of this frame, the C-Port prepares to repeat Lobe Media Test (TEST) frames. When the C-Port is ready it transmits a copy of the LMTN frame back to the Station. On receipt of this Lobe Media Test Notification frame, the Station commences the execution of the Lobe Media Test as defined in 9.1.6.

14.3.1.3 X'17'-Remove Alert (RMV_ALRT)

Both the Station and C-Port using the TXI Access Protocol and operating at the High Media Rate use the Remove Alert MAC frame. The Remove Alert MAC frame indicates to the entity at the other end of the dedicate link that the sender is about to enter the Bypass state. The Remove Alert MAC frame is sent using an assured delivery mechanism in an attempt to ensure that the receiving entity receives this frame.

14.3.2 Subvector Descriptions

14.3.2.1 X'0C'-Phantom (PD)

This subvector has a value field 2 octets long and indicates to the C-Port which phantom signaling and wire fault detection methods are being supported by the Station. The methods are defined in Table 14-1. All other values are reserved for future standardization.

14.3.2.2 X'0E'-Access Protocol Request (AP_REQ)

This subvector has a value field 2 octets long and is used by the Station in the Registration Request MAC frame to indicate to the C-Port which access protocol is being requested, and optionally a set of enhanced capabilities the Station possesses. The AP_REQ value is formed by bit-wise ORing together one Access Protocol request type and zero or more capability values. All other values are reserved for future standardization.

Table 14-1—Phantom Subvector Definition

Value	Definition
X'0001'	The Station supports the phantom signaling and wire fault detection method described in 7.2.1 in IEEE Std 8802-5-1998.
X'0002'	The Station does not support phantom signaling and, therefore, cannot support wire fault detection.

The C-Port can use its mask PPV(AP_MASK) to determine if the Station is requesting an acceptable access protocol. The C-Port performs this determination using both bit-wise operations and direct comparisons with known values.

Table 14-2—Access Protocol Request Subvector Definition

Value	Definition
X'0002'	Transmit Immediate (TXI) Access Protocol requested.
X'0004'	Station is 100 Mbit/s capable.

14.3.2.3 X'0F'-Access Protocol Response (AP_RSP)

This subvector has a value field 2 octets long and is used by the C-Port in Port Mode in the Registration Response MAC frame in response to the Registration Request MAC frame. This subvector's value indicates whether the requested access protocol, phantom signaling, and wire fault support method have been accepted or denied, or if the C-Port wants to use one of the capabilities the Station indicated in its AP_REQ subvector. The values are defined in Table 14-3. All other values are reserved for future standardization.

Table 14-3—Access Protocol Response Subvector Definition

Value	Definition
X'0000'	Access Denied. The Access Protocol or the phantom signaling and wire fault support method is unsupported by the C-Port in Port Mode either by design or by management.
X'0002'	Transmit Immediate (TXI) Access Protocol and phantom signaling and wire fault support method accepted.
X'0004'	The C-Port will support the Station 100 Mbit/s capability.

14.3.2.4 X'26'-Wrap Data

For the Lobe Media Test employed when FSLMTO=1, the length of the Wrap Data subvector shall be 90 octets, inclusive of the SVL and SVI fields. The contents of the SVV field are undefined.

14.3.2.5 X'2D'-Isolating Error Counts

This subvector has a value field 6 octets long containing the Error counters shown in Table 14-4 and defined in 10.6. The values of the error counters indicate the number of errors of each type detected since the Station or C-Port transmitted the last error report. If an error counter has not been incremented, is marked as not used, or is marked reserved, then its value shall be reported as X'00'.

The second character of the counter's name specifies whether it is a C-Port (P) counter or a Station (S) counter.

Table 14-4—Isolating Error Counts Definition

Access Protocol	Octet	Counter Name	Station Counter	C-Port Counter
TKP	0	Line Error	CSLE	CPLE
	1	Internal Error	CSIE	CPIE
	2	Burst Error	Not Used	Not Used
	3	AC Error	CSACE	CPACE
	4	Abort Sequence transmitted	CSABE	CPABE
	5	Reserved	Not Used	Not Used
TXI	0	Line Error	CSLE	CPLE
	1	Internal Error	CSIE	CPIE
	2	Burst Error	Not Used	Not Used
	3	AC Error	Not Used	Not Used
	4	Abort Sequence transmitted	CSABE	CPABE
	5	Reserved	Not Used	Not Used

14.3.2.6 X'2E'-Nonisolating Error Counts

This subvector has a value field 6 octets and contains the Error counters shown in Table 14-5 and defined in 10.6. The values of the error counters indicate the number of errors of each type detected since the Station or C-Port transmitted the last error report. If an error counter has not been incremented, is marked as not used, or is marked reserved, then its value shall be reported as X'00'.

The second character of the counter's name specifies whether it is a C-Port (P) counter or a Station (S) counter.

14.3.3 MAC Frames Transmitted

The following subclauses specify the MAC frame transmit requirements for high media rate operation. The transmission of MAC frames shall take priority over the transmission of LLC frames.

Table 14-5—Nonisolating Error Counts Definition

Access Protocol	Octet	Counter Name	Station Counter	C-Port Counter
TKP	0	Lost Frame Error	CSLFE	CPLFE
	1	Receive Congestion Error	CSRCE	CPRCE
	2	Frame Copied Error	CSFCE	CPFCE
	3	Frequency Error	Not Used	Not Used
	4	Token Error	CSTE	CPTE
	5	Reserved	Not Used	Not Used
TXI	0	Lost Frame Error	Not Used	Not Used
	1	Receive Congestion Error	CSRCE	CPRCE
	2	Frame Copied Error	Not Used	Not Used
	3	Frequency Error	Not Used	Not Used
	4	Token Error	Not Used	Not Used
	5	Reserved	Not Used	Not Used

14.3.3.1 Station MAC Frames Transmitted

A Station shall support the transmission of the frames shown in Table 10-12 as required by the Station Operation Tables, and additionally frames shown in Table 14-6. The Station MAC may optionally transmit frames that are shown in these tables, but are not required by the Station Operation Tables.

The Lobe Media Test and Lobe Media Test Notification MAC frames shall be transmitted as shown. Other frames may be transmitted with additional subvectors.

Table 14-6—Station MAC Frame Transmit Definitions

Vector (VI, Name)	FC	DA	VC	Designator**2 Subvectors (SVI, Name)
X'08' **1 Lobe Media Test	X'08'	FA (TEST)	X'00'	X'26' Wrap Data
X'16' **1 Lobe Media Test Notification	X'08'	Broadcast	X'00'	None
X'17' **1 Remove Alert	X'07'	Broadcast	X'30'	None

****1** Shall not be transmitted with an RI field.
****2** Subvectors with no preceding designator shall be transmitted.

14.3.3.2 C-Port MAC Frames Transmitted

A C-Port shall support the transmission of the frames shown in Table 10-13 as required by the C-Port Operation Tables, and additionally frames shown in Table 14-7. The C-Port MAC may optionally transmit frames that are shown in these tables, but are not required by the C-Port Operation Tables.

The Lobe Media Test and Lobe Media Test Notification MAC frames shall be transmitted as shown. Other frames may be transmitted with additional subvectors.

Table 14-7—C-Port MAC Frame Transmit Definitions

Vector (VI, Name)	FC	DA	VC	Designator**2 Subvectors (SVI, Name)
X'08' **1**3 Lobe Media Test	X'08'	FA(TEST)	X'00'	X'26' Wrap Data
X'16' **1 Lobe Media Test Notification	X'08'	Broadcast	X'00'	none
X'17' **1 Remove Alert	X'07'	Broadcast	X'03'	none

****1** Shall not be transmitted with an RI field.
****2** Subvectors with no preceding designator shall be transmitted.
****3** The Lobe Media Test MAC frame is only transmitted by a C-Port with FPRPTO set to 0.

14.3.4 MAC Frames Received

This subclause defines the MAC frame reception requirements of the Station and C-Port, and the receive MAC frame processing used by the Station and C-Port.

14.3.4.1 Station MAC Frame Reception

A DTR station or a C-Port in Station Emulation Mode shall support the reception of the frames defined in Table 10-14 as required by the Station Operation Tables in 9.2.5, and additionally frames defined in Table 14-8.

A Station may also optionally support the reception of frames not specified in these tables.

14.3.4.2 C-Port MAC Frame Reception

A C-Port in Port Mode shall support the reception of the frames defined in Table 10-15 as required by the Port Operation Tables in 9.3.4, and additionally frames defined in Table 14-9.

A C-Port may also optionally support the reception of frames not specified in these tables.

14.4 System timers

In general, timers control the maximum period of time that a particular condition may exist. All timers are stopped when the Bypass state (JS=BP) of the Join state machine is entered and do not start until the first time they are reset.

Table 14-8—Station MAC Frame Receive Definitions

Vector (VI, Name)	FC	VC	Designator**1 Subvectors (SVI, name)
X'08' Lobe Media Test	X'08'	X'00'	req X'26' Wrap Data
X'16' Lobe Media Test Notification	X'08'	X'00'	none
X'17' Remove Alert	X'07'	X'03'	none
**1 Subvectors with no preceding designator may or may not be present within the received vector, and are not required for verification.			

Table 14-9—C-Port MAC Frame Receive Definitions

Vector (VI, Name)	FC	VC	Designator**1 Subvectors (SVI, name)
X'08' Lobe Media Test	X'08'	X'00'	req X'26' Wrap Data
X'16' Lobe Media Test Notification	X'08'	X'00'	none
X'17' Remove Alert	X'07'	X'30'	none
**1 Subvectors with no preceding designator may or may not be present within the received vector, and are not required for verification.			

14.4.1 Station Timers

The following timers are used by DTR Stations and C-Ports in Station Emulation mode operating at high media rate, in addition to the timers defined in 10.4.1.

14.4.1.1 Timer, Station High Media Rate Wait (TSHMRW)

Each Station shall have a timer TSHMRW. The timer is used to time-out waiting for LINK_STATUS to be asserted during 100 Mbit/s trade up. The value of TSHMRW shall be between 8.5 s and 10 s.

14.4.1.2 Timer, Station Lobe Media Test Notification Pace (TSLMTNP)

Each Station shall have a timer TSLMTNP. The timer is used to pace the transmission of LMTN MAC frames during the notification phase of LMT. The value of TSLMTNP shall be between 10 ms and 30 ms.

14.4.1.3 Timer, Station Lobe Media Test Pace (TSLMTP)

Each Station shall have a timer TSLMTP. The timer is used to time-out waiting for a TEST MAC frame to be repeated during the testing phase of LMT. The value of TSLMTP shall be between 10 ms and 30 ms.

14.4.1.4 Timer, Station Lobe Media Test Response (TSLMTR)

Each Station shall have a timer TSLMTR. This timer is used to bound the time allowed for a C-Port to enable its frame repeat path. The value of TSLMTR shall be between 200 ms and 250 ms.

14.4.1.5 Timer, Station Remove Alert Pace (TSRAP)

Each Station shall have a timer TSRAP. This timer is used to pace the transmission of the RMV_ALRT MAC frames during the removal process. The value of TSRAP shall be between 10 ms and 30 ms.

14.4.2 C-Port Timers

The following timers are used by DTR C-Ports in Port mode operating at high media rate, in addition to the timers defined in 10.4.1.

14.4.2.1 Timer, C-Port High Media Rate Wait (TPHMRW)

Each C-Port shall have a timer TPHMRW. The timer is used to time-out waiting for LINK_STATUS to be asserted during 100 Mbit/s trade up. The value of TPHMRW shall be between 8.5 s and 10 s.

14.4.2.2 Timer, C-Port Phantom Detect (TPPD)

Each C-Port shall have a timer TPPD. This timer is used to ascertain if a C-Port fails to detect phantom being raised by the Station after the two entities have entered their Join complete states. The value of TPPD shall be between 1.8 s and 2.2 s. A value of 2 s is recommended. This timer is only used when phantom detection is supported by the C-Port.

14.4.2.3 Timer, C-Port Protocol Loss Detect (TPPLD)

Each C-Port shall have a timer TPPLD. This timer is used during error recovery to ensure that the protocol is operating correctly. The timer expiring indicates that the protocol is not operating correctly, and the C-Port should return to bypass. The error conditions this timer catches are either phantom, if supported, not being de-asserted, or the start of lobe media test not being detected. The value of TPPLD shall be between 15.8 s and 18.2 s. A value of 16s is recommended.

14.4.2.4 Timer, C-Port Remove Alert Pace (TPRAP)

Each C-Port shall have a timer TPRAP. This timer is used to pace the transmission of the RMV_ALRT MAC frames during the removal process. The value of TPRAP shall be between 10 ms and 30 ms.

14.4.2.5 Timer, C-Port Trade-Up Assured Delivery (TPTUAD)

Each C-Port supporting high media rate trade-up shall have a timer TPTUAD. The period before this timer expires allows the C-Port to handle any further Registration Request frames from the Station at the current media rate, providing an assured delivery process for high media rate trade-up. When the timer expires, the C-Port changes Media Rate and waits until it sees Link Status from the Station. The value of TPTUAD shall be between 240 ms and 300 ms.

14.5 Policy Flags and Variables

14.5.1 Station Policy Flags and Variables

The Station Policy Flags and Variables defined in this subclause are used in addition to those defined in 10.5 by both a DTR Station and a C-Port in Station Emulation Mode using the TXI Access Protocol at high media rate.

14.5.1.1 Station Policy Flag Definitions

The station policy flags ("O"-suffix acronym) are set externally to the SMAC (Clause 11) and are not changed by the SMAC FSMs.

14.5.1.1.1 Flag, Station Auto-Negotiation Option (FSANO)

The flag FSANO indicates the Auto-Negotiation capabilities of the Station. It is used prior to Connect.SMAC during PHY initialization (see Table 9.8-7). If FSANO is set to 0, the Station does not support Auto-Negotiation. FSANO shall be set to 0 for 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s operation. FSANO shall be set to 0 for 1000 Mbit/s implementations using PSC-X and FSANO shall be set to 1 for 1000 Mbit/s implementations using PSC-T.

14.5.1.1.2 Flag, Station Abort Sequence Option (FSASO)

This flag is used to control the ending sequence for aborted frames when the Station is operating at the high media rate. When FSASO is set to 0, an aborted is ended with an abort sequence. When FSASO is set to 1, an aborted frame is ended with an invalid FCS and by setting the Error Detected bit (E) in the Ending Delimiter field.

14.5.1.1.3 Flag, Station High Media Rate Trade-Up Option (FSHMRTUO)

When this flag is set to 1 the Station indicates to the C-Port during registration that it is capable of 100 Mbit/s when connecting at 4 or 16 Mbit/s.

14.5.1.1.4 Flag, Station Lobe Media Test Option (FSLMTO)

The flag FSLMTO is used to indicate the type of lobe media test being used by a Station. If FSLMTO is set to 0, the Station shall be operating at 4/16 Mbit/s (FSMRO < 2) and implement the lobe media test as specified by IEEE Std 8802-5-1998. For this type of lobe media test, the C-Port must provide a repeat path as defined in 9.7.1. If FSLMTO is set to 1, the Station shall implement the two-phase lobe media test as defined in 9.1.6.2.1. For this type of lobe media test, the C-Port must provide either a PHY or PMAC repeat path as defined in 9.7.1 or 9.7.2.

When the Station is operating at high media rate (FSMRO > 1), the Station shall be implemented with FSLMTO set to 1.

14.5.1.1.5 Flag, Station Medium Rate Option (FSMRO)

The flag FSMRO is used to indicate the operating speed of the Station as shown in Table 14-10.

14.5.1.2 Station Policy Variable Definitions

Station policy variables are similar to policy flags. They are set by management prior to Connect.SMAC and are not altered by the SMAC. Table 14-11 specifies modified Station policy variable definitions.

Table 14-10—FSMRO Settings

FSMRO setting	Meaning
FSMRO = 0	Station shall operate at 4 Mbit/s.
FSMRO = 1	Station shall operate at 16 Mbit/s.
FSMRO = 2	Station shall operate at 100 Mbit/s.
FSMRO = 3	Station shall operate at 1000 Mbit/s.

Table 14-11—Station Policy Variables

Variable	Permitted Values	Description
SPV(AP_MASK)	• A bitmask value of X'0001' shall indicate the TKP Access Protocol is being supported. • A bitmask value of X'0002' shall indicate the TXI Access Protocol is being supported. • The Station shall not use any other value of SPV(AP_MASK).	The Station policy variable SPV(AP_MASK) represents the mask used to indicate which access protocols are being supported.
SPV(MAX_TX)	• At 4 Mbit/s, the maximum permitted value is 4550. • At 16 Mbit/s, the maximum permitted value is 18 200. • At 100 Mbit/s, the maximum permitted value is 18 207. • At 1000 Mbit/s, the maximum permitted value is 18 211.	The Station policy variable SPV(MAX_TX) represents the maximum octet transmit count the Station can support, per frame. The count covers the complete frame sequence, including SSD, ESD, and IFG defined in 14.1.1. A Station may support a value or a value range for this variable, provided these values do not exceed the maximum frame size permitted by the medium rate. When a Station is assigned a value range, a single point within the range is used during magnitude comparisons. An implementation is not required to use same point for each comparison.
SPV(PD)	• The value X'0001' indicates that the Station supports phantom signaling and wire fault detection as described in IEEE Std 8802-5-1998. • The value X'0002' indicates that the Station does not support phantom signaling. Therefore, wire fault detection cannot be supported. • All other values of SPV(PD) are reserved for future standardization.	The Station Policy Variable SPV(PD) describes which method of phantom signaling and wire fault detection is in use by the Station. The value is a bit mask, and only a single bit shall be set.

Note that the values for SPV(MAX_TX) are chosen such that at 16Mbit/s, 100Mbit/s, and 1000Mbit/s the maximum permitted length of the media-encoding-independent portion of the frame remains the same.

14.5.1.3 Allowable Station Policy Flag and Variable Settings

The Station policy flags and variables defined in the previous two subclauses and Clause 10 have interdependencies that implementers should take into account. The following assertions shall be true in a Station implementation, in addition to the assertions in Clause 10:

• FSMRO>1	⇒	AND(SPV(AP_MASK), X'0003')=X'0002' **and**
		FSOPO=1 **and**
		FSRDO=1
• FSLMTO=0	⇒	FSMRO<2
• FSMRO>1	⇒	FSLMTO=1
• FSMRO<2	⇒	FSASO=0
• SPV(PD)=0002	⇒	SMRO>1
• FSMRO<2	⇒	SPV(PD)=0001
• FSMRO=3	⇒	SPV(PD)=0002
• FSMRO<3	⇒	FSANO=0

14.5.2 C-Port Policy Flags and Variables

The C-Port Policy Flags and Variables defined in this subclause are used in addition to those defined in subclause 10.5 by a C-Port at high media rate.

14.5.2.1 C-Port Policy Flag Definitions

The C-Port policy flags (“O”-suffix acronym) are set externally to the PMAC (see Clause 11) and are not changed by the PMAC FSMs.

14.5.2.1.1 Flag, C-Port Auto-Negotiation Option (FPANO)

The flag FPANO indicates the Auto-Negotiation capabilities of the C-Port. It is used prior to Connect.PMAC during PHY initialization (see Table 9.8-7). If FPANO is set to 0, the C-Port does not support Auto-Negotiation. FPANO shall be set to 0 for 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s operation. FPANO shall be set to 0 for 1000 Mbit/s implementations using PSC-X and FPANO shall be set to 1 for 1000 Mbit/s implementations using PSC-T.

14.5.2.1.2 Flag, C-Port Abort Sequence Option (FPASO)

When the C-Port is operating at 4 or 16 Mbit/s, this flag is used to control the ending sequence for overlength frames when cut through operation is supported by the PMAC. When FPASO is set to 0, an overlength frame is ended with an abort sequence. When FPASO is set to 1, an overlength frame is ended with an invalid FCS and by setting the Error Detected bit (E) in the Ending Delimiter field.

When the C-Port is operating at the high media rate, this flag is used to control the ending sequence for aborted frames. When FPASO is set to 0, an aborted is ended with an abort sequence. When FPASO is set to 1, an aborted frame is ended with an invalid FCS and by setting the Error Detected bit (E) in the Ending Delimiter field.

14.5.2.1.3 Flag, C-Port High Media Rate Trade-up Option (FPHMRTUO)

When this flag is set to 1, the C-Port positively responds to the Station's request to a 100 Mbit/s Trade-up request (AP_RSP=0006). If this flag is set to 0, the C-Port responds to the Station that it must remain at it designated speed and access protocol (AP_RSP=0002).

14.5.2.1.4 Flag, C-Port Medium Rate Option (FPMRO)

The flag FPMRO is used to indicate the operating speed of the C-Port as shown in Table 14-12.

Table 14-12—FPMRO Settings

FPMRO setting	Meaning
FPMRO = 0	C-Port shall operate at 4 Mbit/s.
FPMRO = 1	C-Port shall operate at 16 Mbit/s.
FPMRO = 2	C-Port shall operate at 100 Mbit/s.
FPMRO = 3	C-Port shall operate at 1000 Mbit/s.

14.5.2.1.5 Flag, C-Port Repeat Option (FPRPTO)

The flag FPRPTO is used to indicate whether a hardware frame repeat path is available in the C-Port. If FPRPTO is set to 1, the hardware repeat path is available. If the flag is set to 0, there is no hardware repeat path. At 4 or 16 Mbit/s, FPRPTO shall be set to 1 indicating that a hardware repeat path is available.

14.5.2.2 C-Port Policy Variable Definitions

C-Port policy variables are similar to policy flags. They are set by management prior to Connect.PMAC and are not altered by the PMAC. Table 14-13 specifies modified C-Port policy variable definitions.

Note that the values for PPV(MAX_TX) are chosen such that at 16Mbit/s, 100Mbit/s and 1000Mbit/s the maximum permitted length of the media-encoding-independent portion of the frame remains the same.

Table 14-13—C-Port Policy Variables

Variable	Permitted Values	Description
PPV(AP_MASK)	• A bitmask value of X'0001' shall indicate the TKP Access Protocol is supported. • A bitmask value of X'0002' shall indicate the TXI Access Protocol is supported. • A bitmask value of X'0004' shall indicate that the C-Port is 100 Mbit/s capable. • The C-Port shall not use any other value of PPV(AP_MASK).	The C-Port policy variable PPV(AP_MASK) represents the mask used to indicate which access protocols and additional capabilities are being supported. The C-Port uses the variable to determine whether it can support the station's access protocol request. The details of how the C-Port determines if the AP request is acceptable are described in 9.1.4.2.
PPV(MAX_TX)	• At 4 Mbit/s, the maximum permitted value is 4550. • At 16 Mbit/s, the maximum permitted value is 18 200. • At 100 Mbit/s, the maximum permitted value is 18 207. • At 1000 Mbit/s, the maximum permitted value is 18 211.	The C-Port policy variable PPV(MAX_TX) represents the maximum octet transmit count the C-Port can support, per frame. The count covers the complete frame sequence, including the SSD, ESD, and IFG as defined in 14.1.1. A C-Port may support a value or a value range for this variable, provided these values do not exceed the maximum frame size permitted by the medium rate. When a C-Port is assigned a value range, a single point within the range is used during magnitude comparisons. An implementation is not required to use same point for each comparison.
PPV(PD_MASK)	• The value X'0001' indicates that the C-Port supports phantom signaling detection and wire fault load provision. • The value X'0002' indicates that the C-Port supports neither phantom signaling detection nor wire fault load provision. • The value X'0003' indicates that the C-Port does not support phantom signaling detection, but supports wire fault load provision. • All other bit positions are reserved for future standardization.	The C-Port policy variable PPV(PD_MASK) represents a bit mask of phantom signaling and wire fault detection methods supported by the C-Port.

14.5.2.3 Allowable C-Port Policy Flag and Variable Settings

The C-Port policy flags and variables defined in the previous two subclauses and Clause 10 have interdependencies that implementers should take into account. The following assertions shall be true in a C-Port implementation, in addition to the assertions in Clause 10:

- FPMRO<2 ⇒ FPASO = 0
- FPMRO<2 ⇒ FPRPTO=1
- PPV(PD_MASK)=X'0002' ⇒ FPMRO>1
- PPV(PD_MASK)=X'0003 ⇒ FPMRO>1
- FPMRO=2 ⇒ AND(PPV(PD_MASK),X'0002')=X'0002'
- FPMRO=3 ⇒ PPV(PD)=0002
- FPMRO<3 ⇒ FPANO=0

Replace Annex A with the following:

Annex A[1]

(normative)

Protocol Implementation Conformance Statement (PICS) proforma

A.1 Introduction

The supplier of a protocol implementation that is claimed to conform to this standard shall complete the following Protocol Implementation Conformance Statement (PICS) proforma:

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use by the following:

a) The protocol implementor, as a checklist to reduce the risk of failure to conform to the standard through oversight;
b) The supplier and acquirer, or potential acquirer, of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard PICS proforma;
c) The user, or potential user, of the implementation, as a basis for initially checking the possibility of interworking with another implementation (note that, while interworking can never be guaranteed, failure to interwork can often be predicted from incompatible PICSs);
d) The protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.2 Abbreviations and special symbols

A.2.1 Status symbols

The following symbols are used in the PICS proforma:

M mandatory field/function
O optional field/function
O.<n> optional field/function indicating mutually exclusive or selectable options among a set
X prohibited field/function
<pred>: simple-predicate condition for an item, dependent on the support marked for <pred>
<pred>:: simple-predicate condition for a table, dependent on the support marked for <pred>

A.2.2 Abbreviations

N/A Not applicable

[1]*Copyright release for PICS proforma*: Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

A.3 Instructions for completing the PICS proforma

A.3.1 General structure for the PICS proforma

The first part of the PICS proforma, implementation identification and protocol summary, is to be completed as indicated with the information necessary to identify fully the supplier and the implementation.

The main part of the PICS proforma is a fixed-format questionnaire divided into subclauses, each containing a group of items. Answers to the questionnaire items are to be provided in the right-most column, either by simply marking an answer to indicate a restricted choice (usually Yes, No, or Not Applicable), or by entering a value, or a set or a range of values. (Note that there are some items where two or more choices from a set of possible answers can apply; all relevant choices are to be marked.)

Each item is identified by an item reference in the first column. The second column contains the question to be answered. The third column contains the reference or references to the material that specifies the item in the main body of the standard. The remainder of the columns record the status of the item-whether the support is mandatory, optional, or conditional-and provide spaces for the answers. See also A.3.4.

The supplier may also provide, or be required to provide, further information, categorized as either “additional information” or “exception information.” When present, each kind of further information is to be provided in a further subclause of items labeled A<i> or E<i>, respectively, for cross-referencing purposes, where <i> is the unambiguous identification for the item (e.g., simply a numerical). There are no other restrictions on its format or presentation.

A completed PICS proforma, including any additional information or exception information, is the PICS for the implementation in question.

Note that where an implementation is capable of being configured in more than one way, according to the items listed in A.5, a single PICS may be able to describe all such configurations. However, the supplier has the choice of providing more than one PICS, each covering some subset of the implementation's configuration capabilities, if that would make presentation of information easier and cleaner.

A.3.2 Additional information

Items of additional information allow a supplier to provide further information intended to assist the interpretation of the PICS. It is not intended or expected that a large quantity will be supplied, and the PICS can be considered complete without any such information. Examples might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations; or a brief rationale, based perhaps upon specific application needs, for the exclusion of features which, although optional, are nonetheless commonly present in implementations of the Token Ring protocol.

References to items of additional information may be entered next to any answer in the questionnaire, and may be included in items of exception information.

A.3.3 Exception information

It may occasionally happen that a supplier will wish to answer an item with mandatory status or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirement. No preprinted answer will be found in the Support column for this; instead, the supplier is required to write into the Support column an E<i> reference to an item of exception information, and to provide the appropriate rationale in the exception item itself.

An implementation for which an exception item is required in this way does not conform to this standard.

Note that a possible reason for the situation described above is that a defect in the standard has been reported, a correction for which is expected to change the requirement not met by the implementation.

A.3.4 Conditional status

A.3.4.1 Conditional items

The PICS proforma contains a number of conditional items. These are items for which the status-mandatory, optional, or prohibited—that applies is dependent upon whether or not certain other items are supported, or upon the value supported for other items.

In many cases, whether or not the item applies at all is conditional in this way, as well as the status when the item does not apply.

A conditional symbol is of the form "<pred>:<s>" where "<pred>" is a predicate as described in A.3.4.2, and "<s>" is one of the status symbols M, O, O.<n>, or X.

A conditional symbol of the form "<pred>::" may be indicated above a particular table. That table shall be completed if and only if the condition evaluates to true.

A.3.4.2 Predicates

A predicate is one of the following:

a) An item-reference for an item in the PICS proforma. The value of the predicate is true if the item is marked as supported, and is false otherwise;
b) A predicate-name, for a predicate defined as a Boolean expression constructed by combining item-references using the Boolean operators AND and OR. The value of the predicate is true if the Boolean expression evaluates to true;
c) The logical negation symbol "¬" prefixed to an item-reference or predicate-name. The value of the predicate is true if the value of the predicate formed by omitting the "¬" symbol is false, and vice-versa.

An asterisk in the Item column indicates each item-reference that is used in a predicate or predicate definition. If such item reference is not supported (false), then the support of the item itself will be indicated as N/A (not applicable); otherwise, the support of the item will be indicated as YES.

A.4 Identification

A.4.1 Implementation identification

Supplier	
Contact point for queries about the PICS	
Implementation name(s) and version(s)	
Other information necessary for full identification—e.g., name(s) and version(s) for machines and/or operating systems; system name(s)	
NOTES 1—Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirements for full identification. 2—The terms *name* and *version* should be interpreted appropriately to correspond with a supplier's terminology (e.g., type, series, model).	

A.4.2 Protocol summary

Protocol version	
Amendments implemented	
Corrigenda implemented	
Have any exception items been required? No [ ] Yes [ ] (See A.3.3; the answer "Yes" means that the implementation does not conform to the standard.)	
Date of statement	

A.5 Major capabilities

Item	Feature	Reference	Status	Support
*DS	Data station	2.4	O.1	Yes [ ] No [ ]
*DTRS	Dedicated Token Ring Station	9.2	O.1	Yes [ ] No [ ]
*DTRP	Dedicated Token Ring C-Port	9.3	O.1	Yes [ ] No [ ]
*ACON	Active retiming concentrator	8.5	O.1	Yes [ ] No [ ]
*PCON	Passive concentrator	8.4	O.1	Yes [ ] No [ ]
*DR4	4 Mbit/s data rate	5.3	O.3	Yes [ ] No [ ]

Item	Feature	Reference	Status	Support
*DR16	16 Mbit/s data rate	5.3	O.3	Yes [ ] No [ ]
*DR100	100 Mbit/s data rate	9.8	O.3	Yes [ ] No [ ]
*DR1000	1000 Mbit/s data rate	9.8	O.3	Yes [ ] No [ ]
*STP	Shielded twisted pair cable attachment	7.2	O.4	Yes [ ] No [ ]
*UTP	Unshielded twisted pair cable attachment: 2-pair	7.2	O.4	Yes [ ] No [ ]
*TWX	Twin-axial cable attachment	9.8.2.4.1	O.4	Yes [ ] No [ ]
*UTP4P	Unshielded twisted pair cable attachment: 4-pair	9.8.2.4.3	O.4	Yes [ ] No [ ]
*FIB	Fibre attachment	13.2	O.4	Yes [ ] No [ ]
*FIB1000	1000 Mbit/s fibre attachment	13.10	O.4	Yes [ ] No [ ]
*PSC-X	1000 Mbit/s physical signaling components for optical fibre and twin-axial cable media	9.8.2.3.1	O.46	Yes [ ] No [ ]
*PSC-T	1000 Mbit/s physical signaling components for 4 pairs of Category 5 UTP cable media	9.8.2.3.2	O.46	Yes [ ] No [ ]
*PMC-CX	1000 Mbit/s physical media components for twin-axial cable media	9.8.2.4.1.	O.49	Yes [ ] No [ ]
*PMC-LX	1000 Mbit/s physical media components for optical fibre (long wavelength laser)	13.10.1	O.49	Yes [ ] No [ ]
*PMC-SX	1000 Mbit/s physical media components for optical fibre (short wavelength laser)	13.10.1	O.49	Yes [ ] No [ ]
*PMC-T	1000 Mbit/s physical media components for 4 pairs of Category 5 UTP cable media	9.8.2.4.3	O.49	Yes [ ] No [ ]
*DTRSTXI	DTR Station using TXI Access Protocol	9.2	DTRS:M	N/A [ ] Yes [ ]
*DTRSTKP	DTR Station using TKP Access Protocol	9.2, 9.6	PRED1:M PRED2:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
*DTRPPMTXI	DTR C-Port in port mode using TXI Access Protocol	9.3	DTRP:M	N/A [ ] Yes [ ]
*DTRPPMTKP	DTR C-Port in port mode using TKP Access Protocol	9.3, 9.4	PRED3:M PRED4:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
*DTRPSETXI	DTR C-Port in station emulation mode using TXI Access Protocol.	9.3, 9.2	DTRP:O	N/A [ ] Yes [ ] No [ ]
*DTRPSETKP	DTR C-Port in station emulation mode using TKP Access Protocol.	9.3, 9.5	PRED3:O PRED4:X	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
*TKP	Station or C-Port using the TKP Access Protocol		PRED5:M	N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
*TXI	Station or C-Port using the TXI Access Protocol		PRED6:M	N/A [ ] Yes [ ]
*DTRPPM	C-Port in port mode		PRED7:M	N/A [ ] Yes [ ]
*DTRPSE	C-Port in station emulation mode		PRED8:M	N/A [ ] Yes [ ]
*LMR	Low Media Rate (4 Mbit/s or 16 Mbit/s)		PRED9:M	N/A [ ] Yes [ ]
*HMR	High Media Rate (100 Mbit/s, 1000 Mbit/s or greater)		PRED10:M	N/A [ ] Yes [ ]
*COPPER	Copper attachment		PRED11:M	N/A [ ] Yes [ ]
*FIBRE	Fibre attachment		PRED12:M	N/A [ ] Yes [ ]

NOTES—
O.1, O.46, O.49: Support for one and only one of the options is required.
O.3, O.4: Support for at least one of the options is required.

PREDICATES—
PRED1 = DTRS **AND** (DR4 **OR** DR16)
PRED2 = DTRS **AND** (DR100 **OR** DR1000)
PRED3 = DTRP **AND** (DR4 **OR** DR16)
PRED4 = DTRP **AND** (DR100 **OR** DR1000)
PRED5 = DS **OR** DTRSTKP **OR** DTRPSETKP **OR** DTRPPMTKPPRED12 = FIB **OR** FIB1000
PRED6 = DTRSTXI **OR** DTRPSETXI **OR** DTRPPMTXI
PRED7 = DTRPPMTXI **OR** DTRPPMTKP
PRED8 = DTRPSETXI **OR** DTRPSETKP
PRED9 = DR4 **OR** DR16
PRED11= STP **OR** UTP **OR** TWX **OR** UTP4P
PRED10 = DR100 **OR** DR1000

A.6 PICS proforma for the MAC

A.6.1 Transmission and Receive Frame Formats

Item	Feature	Reference	Status	Support
FF1a	Token transmit	3.1.1	TKP:M	N/A [ ] Yes [ ]
FF1b	Token receive	3.1.1	TKP:M	N/A [ ] Yes [ ]
FF2a	MAC frame transmit	3.1.2	M	Yes [ ]
FF2b	MAC frame receive	3.1.2	M	Yes [ ]
FF3a	LLC frame transmit	3.1.2	M	Yes [ ]
FF3b	LLC frame receive	3.1.2	M	Yes [ ]
*FF3c	LLC frame cut-through	12	DTRP:O	N/A [ ] Yes [ ] No [ ]
FF4a	Abort sequence transmit	3.1.3	LMR:M	N/A [ ] Yes [ ]
FF4b	Abort sequence receive	3.1.3	LMR:M	N/A [ ] Yes [ ]
*FF4c	Abort sequence transmit	14.1.2	HMR:O	N/A [ ] Yes [ ] No [ ]
FF4d	Abort sequence receive	14.1.2	HMR:M	N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
FF4e	Generation of invalid FCS to abort transmit	10.1	PRED13:O	N/A [ ] Yes [ ] No [ ]
FF4f	Generation of invalid FCS to abort transmit	14.1.2	PRED14:M	N/A [ ] Yes [ ]
FF5a	Fill transmit	3.1.4	M	Yes [ ]
FF5b	Fill receive	3.1.4	M	Yes [ ]
PREDICATES— PRED13 = LMR **AND FF3c** PRED14 = HMR **AND** ¬FF4c				

A.6.2 Frame Transmit and Receive Parameters

Item	Feature	Reference	Status	Support
FP1a	Starting delimiter transmit	3.2.1	LMR:M	N/A [ ] Yes [ ]
FP1b	Starting delimiter receive	3.2.1	LMR:M	N/A [ ] Yes [ ]
FP1c	Starting delimiter transmit	14.2.2	HMR:M	N/A [ ] Yes [ ]
FP1d	Starting delimiter receive	14.2.2	HMR:M	N/A [ ] Yes [ ]
FP2a	Access control transmit	3.2.2	TKP:M	N/A [ ] Yes [ ]
FP2b	Access control receive	3.2.2	TKP:M	N/A [ ] Yes [ ]
FP2c	Access control transmit	10.2.1	TXI:M	N/A [ ] Yes [ ]
FP2d	Access control receive	10.2.1	TXI:M	N/A [ ] Yes [ ]
FP3a	Frame control transmit	3.2.3	M	Yes [ ]
FP3b	Frame control receive	3.2.3	M	Yes [ ]
FP4a	Destination address transmit	3.2.4.1	TKP:M	N/A [ ] Yes [ ]
FP4b	Destination address receive	3.2.4.1	TKP:M	N/A [ ] Yes [ ]
FP4c	Destination address transmit	10.2.2	TXI:M	N/A [ ] Yes [ ]
FP4d	Destination address receive	10.2.2	TXI:M	N/A [ ] Yes [ ]
FP5a	Source address transmit	3.2.4.2	TKP:M	N/A [ ] Yes [ ]
FP5b	Source address receive	3.2.4.2	TKP:M	N/A [ ] Yes [ ]
FP5c	Source address transmit	10.2.2	TXI:M	N/A [ ] Yes [ ]
FP5d	Source address receive	10.2.2	TXI:M	N/A [ ] Yes [ ]
FP6a	Routing information indicator transmit	3.2.4.2	M	Yes [ ]
FP6b	Routing information indicator receive	3.2.4.2	M	Yes [ ]
*FP7a	Routing information field transmit	3.2.5	O	Yes [ ] No [ ]
FP7b	Routing information field receive	3.2.5	M	Yes [ ]
FP8a	RI field length bits transmit	3.2.5	FP7a:M	N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
FP8b	RI field length bits receive	3.2.5	M	Yes [ ]
FP9a	MAC frame, info field transmit	3.2.6.2	M	Yes [ ]
FP9b	MAC frame, info field receive	3.2.6.2	M	Yes [ ]
FP10a	LLC frame, info field transmit	3.2.6.3	M	Yes [ ]
FP10b	LLC frame, info field receive	3.2.6.3	DR4:M	N/A [ ] Yes [ ]
	Maximum LLC frame, info receive length (133 min)			_____ octets
FP10c	LLC frame, info field receive	3.2.6.3	DR16:M	N/A [ ] Yes [ ]
	Maximum LLC frame, info receive length (133 min)			_____ octets
FP10d	LLC frame, info field receive	14.1.1	DR100:M	N/A [ ] Yes [ ]
	Maximum LLC frame, info receive length (133 min)			_____ octets
FP10e	LLC frame, info field receive	14.1.1	DR1000:M	N/A [ ] Yes [ ]
	Maximum LLC frame, info receive length (133 min)			_____ octets
FP11a	Frame check sequence transmit	3.2.7	M	Yes [ ]
FP11b	Frame check sequence receive	3.2.7	M	Yes [ ]
FP12a	Ending delimiter transmit	3.2.8	PRED15:M	N/A [ ] Yes [ ]
FP12b	Ending delimiter receive	3.2.8	PRED15:M	N/A [ ] Yes [ ]
FP12c	Ending delimiter transmit	10.2.3	PRED16:M	N/A [ ] Yes [ ]
FP12d	Ending delimiter receive	10.2.3	PRED16:M	N/A [ ] Yes [ ]
FP13a	Frame status transmit	3.2.9	PRED15:M	N/A [ ] Yes [ ]
FP13b	Frame status receive	3.2.9	PRED15:M	N/A [ ] Yes [ ]
FP13c	Frame status transmit	10.2.4	PRED16:M	N/A [ ] Yes [ ]
FP13d	Frame status receive	10.2.4	PRED16:M	N/A [ ] Yes [ ]
FP14a	End Transmit transmit	14.2.1.1.2	PRED17:M	N/A [ ] Yes [ ]
FP14b	End Transmit receive	14.2.1.1.2	PRED17:M	N/A [ ] Yes [ ]
PREDICATES— PRED15 = LMR **AND** TKP PRED16 = LMR **AND** TXI PRED17 = HMR **AND** TXI				

A.6.3 Transitions relating to MAC Frame

A.6.4 MAC Timers

A.6.4.1 Station or C-Port using TKP Access Protocol — TKP

Item	Feature	Reference	Status	Support
TRM	Transitions relating to MAC Frames	4, 9.2, 9.3, 9.4, 9.5, 9.6	M	Yes [ ]

Item	Feature	Reference	Status	Support
TAM	Active monitor	3.4.2.1	M	Yes [ ]
TBR	Beacon repeat	3.4.2.2	M	Yes [ ]
TBT	Beacon transmit	3.4.2.3	M	Yes [ ]
TCT	Claim token	3.4.2.4	M	Yes [ ]
TER	Error report	3.4.2.5	M	Yes [ ]
TID	Insert delay	3.4.2.6	M	Yes [ ]
TJR	Join ring	3.4.2.7	M	Yes [ ]
TNT	No token	3.4.2.8	M	Yes [ ]
TQP	Queue PDU	3.4.2.9	M	Yes [ ]
TRH	Remove hold	3.4.2.10	M	Yes [ ]
TRI	Request initialization	3.4.2.12	M	Yes [ ]
TRP	Ring purge	3.4.2.14	M	Yes [ ]
TRR	Return to repeat	3.4.2.13	M	Yes [ ]
TRW	Remove wait	3.4.2.11	M	Yes [ ]
TSL	Signal loss	3.4.2.15	M	Yes [ ]
TSM	Standby monitor	3.4.2.16	M	Yes [ ]
TVX	Valid transmission	3.4.2.17	M	Yes [ ]
TWF	Wire fault	3.4.2.19	M	Yes [ ]
TWFD	Wire fault delay	3.4.2.18	M	Yes [ ]
TSRW	Station Registration Wait	10.4.1.13	¬DS:M	N/A [ ] Yes [ ]
TLMTR	Station Lobe Media Test Running	10.4.3.1	¬DS:O	N/A [ ] Yes [ ] No [ ]

A.6.4.2 Station using TXI Access Protocol—(DTRS and TXI) or DTRPSETXI

Item	Feature	Reference	Status	Support
TSER	Error Report	10.4.1.1	M	Yes [ ]
TSHMRW	High Media Rate Wait	14.4.1.1	HMR:M	N/A [ ] Yes [ ]
TSIP	Insert Process	10.4.1.2	M	Yes [ ]
TSIS	Initial Sequence	10.4.1.3	M	Yes [ ]

Item	Feature	Reference	Status	Support
TSIT	Internal Test	10.4.1.4	M	Yes [ ]
TSJC	Join Complete	10.4.1.5	M	Yes [ ]
TSLMT	Lobe Media Test	10.4.1.6	M	Yes [ ]
TSLMTC	Lobe Media Test Complete	10.4.1.7	M	Yes [ ]
TSLMTD	Lobe Media Test Delay	10.4.1.8	M	Yes [ ]
TSLMTNP	Lobe Media Test Notification Pace	14.4.1.2	FSLMTO_1: M	N/A [ ] Yes [ ]
TSLMTP	Lobe Media Test Pace	14.4.1.3	FSLMTO_1: M	N/A [ ] Yes [ ]
TSLMTR	Lobe Media Test Response	14.4.1.4	FSLMTO_1: M	N/A [ ] Yes [ ]
TSQHB	Queue Heart Beat	10.4.1.9	M	Yes [ ]
TSQP	Queue PDU	10.4.1.10	M	Yes [ ]
TSRAP	Remove Alert Pace	14.4.1.5	HMR:M	N/A [ ] Yes [ ]
TSREQ	Registration Request	10.4.1.11	M	Yes [ ]
TSRHB	Receive Heart Beat	10.4.1.12	M	Yes [ ]
TSSL	Signal Loss	10.4.1.13	M	Yes [ ]
TSWF	Wire Fault	10.4.1.14	SRA5:M	N/A [ ] Yes [ ]
TSWFD	Wire Fault Delay	10.4.1.15	SRA5:M	N/A [ ] Yes [ ]

A.6.4.3 C-Port in port mode using TXI Access Protocol—DTRPPMTXI

Item	Feature	Reference	Status	Support
TPER	Error Report	10.4.2.1	M	Yes [ ]
TPHMRW	High Media Rate Wait	14.4.2.1	HMR:M	N/A [ ] Yes [ ]
TPIRD	Insert Request Delay	10.4.2.2	M	Yes [ ]
TPIT	Internal Test	10.4.2.3	M	Yes [ ]
TPLMTR	Lobe Media Test Running	10.4.2.5	M	Yes [ ]
TPPD	Phantom Detect	14.4.2.2	LMR:O PRED18:M	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
TPPLD	Protocol Loss Detect	14.4.2.3	LMR:O PRED18:M	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
TPQHB	Queue Heart Beat	10.4.2.6	M	Yes [ ]
TPQP	Queue PDU	10.4.2.7	M	Yes [ ]
TPRAP	Remove Alert Pace	14.4.2.4	HMR:M	N/A [ ] Yes [ ]
TPRHB	Received Heart Beat	10.4.2.8	M	Yes [ ]

Item	Feature	Reference	Status	Support
TPRQD	Registration Query Delay	10.4.2.9	M	Yes [ ]
TPSL	Signal Loss	10.4.2.10	M	Yes [ ]
TPTUAD	Trade-Up Assured Delivery	10.4.2.5	PRED19:M	N/A [ ] Yes [ ]
PREDICATES— PRED18 = HMR **AND** PRA3 PRED19 = HMR **AND** FPHMRTUO_1				

A.6.5 MAC Policy Flags and Variables

A.6.5.1 Station or C-Port using TKP Access Protocol—TKP

Item	Feature	Reference	Status	Support
FBHO_0	Beacon handling option — flag=0	3.5.1	O.5	Yes [ ] No [ ]
FBHO_1	Beacon handling option — flag=1	3.5.1	O.5	Yes [ ] No [ ]
FCCO_0	Claim contender option — flag=0	3.5.2	O.6	Yes [ ] No [ ]
FCCO_1	Claim contender option — flag=1	3.5.2	O.6	Yes [ ] No [ ]
FECO_0	Error counting option — flag=0	3.5.4	O.7	Yes [ ] No [ ]
FECO_1	Error counting option — flag=1	3.5.4	O.7	Yes [ ] No [ ]
FETO_0	Early token release option — flag=0	3.5.3	DR4:M DR16:O.8	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ]
FETO_1	Early token release option — flag=1	3.5.3	DR16:O.8	N/A [ ] Yes [ ] No [ ]
FGTO_0	Good token option — flag=0	3.5.10	O.9	Yes [ ] No [ ]
FGTO_1	Good token option — flag=1	3.5.10	O.9	Yes [ ] No [ ]
FMFTO_0	Multiple frame transmission — flag=0	3.5.6	O.10	Yes [ ] No [ ]
FMFTO_1	Multiple frame transmission — flag=1	3.5.6	O.10	Yes [ ] No [ ]
FMRO_0	Media rate — flag=0	3.5.5	DR4:M	N/A [ ] Yes [ ]
FMRO_1	Media rate — flag=1	3.5.5	DR16:M	N/A [ ] Yes [ ]
FRRO_0	Reject remove option — flag=0	3.5.7	O.11	Yes [ ] No [ ]
FRRO_1	Reject remove option — flag=1	3.5.7	O.11	Yes [ ] No [ ]
FTEO_0	Token error detect option — flag=0	3.5.8	O.12	Yes [ ] No [ ]
FTEO_1	Token error detect option — flag=1	3.5.8	O.12	Yes [ ] No [ ]
FTHO_0	Token handling option — flag=0	3.5.9	O.13	Yes [ ] No [ ]
FTHO_1	Token handling option — flag=1	3.5.9	O.13	Yes [ ] No [ ]
FTUBO_0	Transmit under-run behavior option — flag=0	3.5.9a	O.14	Yes [ ] No [ ]
FTUBO_1	Transmit under-run behavior option — flag=1	3.5.9a	O.14	Yes [ ] No [ ]

Item	Feature	Reference	Status	Support
FWFDO_0	Wire fault detection option — flag=0	3.5.11	O.15	Yes [ ] No [ ]
FWFDO_1	Wire fault detection option — flag=1	3.5.11	O.15	Yes [ ] No [ ]
NOTE— O.5–O.15: Support of at least one of the policy flag settings is required.				

A.6.5.2 Station using TXI Access Protocol—(DTRS and TXI) or DTRPSETXI

Item	Feature	Reference	Status	Support
FSANO_0	Auto Negotiation Option — flag=0	14.5.1.1.1	DR100:M PSC-X:M PSC-T:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ] N/A [ ] Yes [ ]
FSANO_1	Auto Negotiation Option — flag=1	14.5.1.1.1	DR100:X PSC-X:X PSC-T:M	N/A [ ] Yes [ ] N/A [ ] Yes [ ] N/A [ ] Yes [ ]
FSASO_0	Abort Sequence Option — flag=0	14.5.1.1.2	HMR:O.16	N/A [ ] Yes [ ] No [ ]
*FSASO_1	Abort Sequence Option — flag=1	14.5.1.1.2	HMR:O.16	N/A [ ] Yes [ ] No [ ]
FSASO_1_FCS	Invalid FCS Generation Method	14.5.1.1.2	FSASO_1:M	N/A [ ] Method___
FSECO_0	Error Counting Option — flag=0	10.5.1.1.1	O.17	Yes [ ] No [ ]
FSECO_1	Error Counting Option — flag=1	10.5.1.1.1	O.17	Yes [ ] No [ ]
FSHMRTUO_0	High Media Rate Trade-Up Option — flag=0	14.5.1.1.3	DR100:O.18 DR1000:M	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
FSHMRTUO_1	High Media Rate Trade-Up Option — flag=1	14.5.1.1.3	DR100:O.18 DR1000:X	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
FSLMTO_0	Lobe Media Test Option — flag=0	14.5.1.1.4	LMR:M HMR:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
*FSLMTO_1	Lobe Media Test Option — flag=1	14.5.1.1.4	LMR:O HMR:M	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
FSMRO_0	Media Rate Option — flag=0	14.5.1.1.5	DR4:O.19	N/A [ ] Yes [ ] No [ ]
FSMRO_1	Media Rate Option — flag=1	14.5.1.1.5	DR16:O.19	N/A [ ] Yes [ ] No [ ]
FSMRO_2	Media Rate Option — flag=2	14.5.1.1.5	DR100:O.19	N/A [ ] Yes [ ] No [ ]
FSMRO_3	Media Rate Option — flag=3	14.5.1.1.5	DR1000:O.19	N/A [ ] Yes [ ] No [ ]
*FSOPO_0	Open Option — flag=0	10.5.1.1.3	O	Yes [ ] No [ ]
FSOPO_1	Open Option — flag=1	10.5.1.1.3	M	Yes [ ]
FSRDO_0	Registration Denied Option — flag=0	10.5.1.1.4	O.20	Yes [ ] No [ ]
FSRDO_1	Registration Denied Option — flag=1	10.5.1.1.4	O.20	Yes [ ] No [ ]
FSREGO_0a	Registration Option — flag=0	10.5.1.1.5	¬FSOPO_0:M	N/A [ ] Yes [ ]
FSREGO_0b	Registration Option — flag=0	10.5.1.1.5	FSOPO_0:O	N/A [ ] Yes [ ] No [ ]
FSREGO_1	Registration Option — flag=1	10.5.1.1.5	M	Yes [ ]
FSRQO_0	Registration Query Option — flag=0	10.5.1.1.6	O.21	Yes [ ] No [ ]
FSRQO_1	Registration Query Option — flag=1	10.5.1.1.6	O.21	Yes [ ] No [ ]
FSRRO_0	Reject Remove Option — flag=0	10.5.1.1.7	O.22	Yes [ ] No [ ]
FSRRO_1	Reject Remove Option — flag=1	10.5.1.1.7	O.22	Yes [ ] No [ ]
NOTE— O.16–O.22: Support of at least one of the options is required.				

A.6.5.3 C-Port in port mode using TXI Access Protocol—DTRPPMTXI

Item	Feature	Reference	Status	Support
FPANO_0	Auto Negotiation Option — flag=0	14.5.2.1.1	DR100:M PSC-X:M PSC-T:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ] N/A [ ] Yes [ ]
FPANO_1	Auto Negotiation Option — flag=1	14.5.2.1.1	DR100:X PSC-X:X PSC-T:M	N/A [ ] Yes [ ] N/A [ ] Yes [ ] N/A [ ] Yes [ ] N/A [ ] Yes [ ]
FPACO_0	AC Repeat Path Option — flag=0	10.5.2.1.1	O.23	Yes [ ] No [ ]
FPACO_1	AC Repeat Path Option — flag=1	10.5.2.1.1	O.23	Yes [ ] No [ ]
FPASO_0	Abort Sequence Option — flag=0	10.5.2.1.2, 14.5.2.1.2	O.24	Yes [ ] No [ ]
*FPASO_1	Abort Sequence Option — flag=1	10.5.2.1.2, 14.5.2.1.2	O.24	Yes [ ] No [ ]
FPASO_1_FCS	Invalid FCS Generation Method	10.5.2.1.2, 14.5.2.1.2	FPASO_1:M	N/A [ ] Method___
FPBHO_0	Beacon Handling Option — flag=0	10.5.2.1.3	O.25	Yes [ ] No [ ]
FPBHO_1	Beacon Handling Option — flag=1	10.5.2.1.3	O.25	Yes [ ] No [ ]
FPECO_0	Error Counting Option — flag=0	10.5.2.1.4	O.26	Yes [ ] No [ ]
FPECO_1	Error Counting Option — flag=1	10.5.2.1.4	O.26	Yes [ ] No [ ]
FPFCO_0	Frame Control Option — flag=0	10.5.2.1.5	O.27	Yes [ ] No [ ]
FPFCO_1	Frame Control Option — flag=1	10.5.2.1.5	O.27	Yes [ ] No [ ]
FPHMRTUO_0	High Media Rate Trade-Up Option — flag=0	14.5.2.1.3	DR100:O.28 DR1000:M	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
*FPHMRTUO_1	High Media Rate Trade-Up Option — flag=1	14.5.2.1.3	DR100:O.28 DR1000:X	N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
FPMRO_0	Media Rate Option — flag=0	10.5.2.1.6	DR4:O.29	N/A [ ] Yes [ ] No [ ]
FPMRO_1	Media Rate Option — flag=1	10.5.2.1.6	DR16:O.29	N/A [ ] Yes [ ] No [ ]
FPMRO_2	Media Rate Option — flag=2	10.5.2.1.6	DR100:O.29	N/A [ ] Yes [ ] No [ ]
FPMRO_3	Media Rate Option — flag=3	10.5.2.1.6	DR1000:O.29	N/A [ ] Yes [ ] No [ ]
FPOTO_0	Operation Table Option — flag=0	10.5.3.3	M	Yes [ ]

Item	Feature	Reference	Status	Support
FPOTO_1	Operation Table Option — flag=1	10.5.3.3	O	Yes [ ] No [ ]
FPRPTO_0	Repeat Option — flag=0	14.5.2.1.5	HMR:O.30	N/A [ ] Yes [ ] No [ ]
FPRPTO_1	Repeat Option — flag=1	14.5.2.1.5	HMR:O.30	N/A [ ] Yes [ ] No [ ]
NOTE— O.23–O.30: Support of at least one of the options is required.				

A.6.6 MAC Counters

A.6.6.1 Station or C-Port using TKP Access Protocol—TKP

Item	Feature	Reference	Status	Support
CABE	Abort error	3.6.1	M	Yes [ ]
CACE	AC error	3.6.2	M	Yes [ ]
CBE	Burst error	3.6.3	M	Yes [ ]
CFCE	Frame-copied error	3.6.4	M	Yes [ ]
CFE	Frequency error	3.6.5	M.31	Yes [ ]
CIE	Internal error	3.6.6	M.31	Yes [ ]
CLE	Line error	3.6.7	M	Yes [ ]
CLFE	Lost frame error	3.6.8	M	Yes [ ]
CRCE	Receive congestion error	3.6.9	M	Yes [ ]
CTE	Token error	3.6.10	M	Yes [ ]
NOTE— M.31: These counters are mandatory, but the indications that cause CFE and CIE to be incremented are optional.				

A.6.6.2 Station using TXI Access Protocol—(DTRS and TXI) or DTRPSETXI

Item	Feature	Reference	Status	Support
CSABE	Abort Error	10.6.1.1	M	Yes [ ]
CSBE	Burst Error	10.6.1.2, 14.3.2.5, 14.3.2.6	LMR:M HMR:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
CSFE	Frequency Error	10.6.1.3, 14.3.2.5, 14.3.2.6	LMR:M.32 HMR:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
CSIE	Internal Error	10.6.1.4	M.32	Yes [ ]
CSLE	Line Error	10.6.1.5	M	Yes [ ]

Item	Feature	Reference	Status	Support
CSRCE	Receive Congestion Error	10.6.1.6	M	Yes [ ]
NOTE— M.32: These counters are mandatory, but the indications that cause CSFE and CSIE to be incremented are optional.				

A.6.6.3 C-Port in port mode using TXI Access Protocol—DTRPPMTXI

Item	Feature	Reference	Status	Support
CPABE	Abort Error	10.6.2.1	M	Yes [ ]
CPBE	Burst Error	10.6.2.2, 14.3.2.5, 14.3.2.6	LMR:M HMR:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
CPFE	Frequency Error	10.6.2.3, 14.3.2.5, 14.3.2.6	LMR:M.33 HMR:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
CPIE	Internal Error	10.6.2.4	M.33	Yes [ ]
CPLE	Line Error	10.6.2.5	M	Yes [ ]
CPRCE	Receive Congestion Error	10.6.2.6	M	Yes [ ]
NOTE— M.33: These counters are mandatory, but the indications that cause CPFE and CPIE to be incremented are optional.				

A.7 PICS proforma for the Physical Layer

A.7.1 PHY Characteristics at 4 Mbit/s and 16 Mbit/s

A.7.1.1 Symbol timing—(DS or DTRS or DTRP or ACON) and LMR

Item	Feature	Reference	Status	Support
ST1	4 Mbit/s data signaling rate	5.2	DR4:M	N/A [ ] Yes [ ]
ST2	16 Mbit/s data signaling rate	5.2	DR16:M	N/A [ ] Yes [ ]
ST3	Acquire phase lock within 1.5 ms	5.7.1	M	Yes [ ]
ST4	Frequency error	5.7.2	O	Yes [ ] No [ ]
ST5	Signal loss indication	5.7.1	O	Yes [ ] No [ ]

A.7.1.2 Symbol encoding and decoding—(DS or DTRS or DTRP or ACON) and LMR

Item	Feature	Reference	Status	Support
SY1	Symbol encoding	5.3	M	Yes [ ]
SY2	Symbol decoding	5.6	M	Yes [ ]
SY3	Burst error/idles transmit	5.4.2	M	Yes [ ]

A.7.1.3 Station latency—(DS or DTRS or DTRP) and LMR and TKP

Item	Feature	Reference	Status	Support
LB1	A fixed latency buffer of 24 symbols	5.8.2	M	Yes [ ]
LB2	4 Mbit/s latency variation	5.8.3	DR4:M	N/A [ ] Yes [ ]
LB3	16 Mbit/s latency variation	5.8.3	DR16:M	N/A [ ] Yes [ ]

A.7.1.4 Accumulated correlated jitter—(DS or DTRS or DTRP or ACON) and LMR

Item	Feature	Reference	Status	Support
AJ1a	Filtered accumulated phase jitter	7.1.1	DR4:M	N/A [ ] Yes [ ]
AJ1b	Filtered accumulated phase jitter	7.1.1	DR16:M	N/A [ ] Yes [ ]
AJ2a	Delta phase accumulated phase jitter	7.1.1	DR4:M	N/A [ ] Yes [ ]
AJ2b	Delta phase accumulated phase jitter	7.1.1	DR16:M	N/A [ ] Yes [ ]
AJ3a	Accumulated uncorrelated jitter	7.1.2	DR4:M	N/A [ ] Yes [ ]
AJ3b	Accumulated uncorrelated jitter	7.1.2	DR16:M	N/A [ ] Yes [ ]
AJ4	PHY net delay	7.1.3	M	Yes [ ]

A.7.1.5 Transmitter specification

A.7.1.5.1 Transmitter specification—(DS or DTRS or DTRP or ACON) and LMR and COPPER)

Item	Feature	Reference	Status	Support
TR1a	Transmit duty cycle distortion	7.2.2.1	DR4:M	N/A [ ] Yes [ ]
TR1b	Transmit duty cycle distortion	7.2.2.1	DR16:M	N/A [ ] Yes [ ]
TR2a	Transmit Tdiff01	7.2.2.2.1	DR4:M	N/A [ ] Yes [ ]
TR2b	Transmit Tdiff01	7.2.2.2.1	DR16:M	N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
TR3	Transmit Tdiffmax	7.2.2.2.1	M	Yes [ ]
TR4a	Transmit waveform(zero/one/SDEL)	7.2.2.2.2	DR4:M	N/A [ ] Yes [ ]
TR4b	Transmit waveform(zero/one/SDEL)	7.2.2.2.2	DR16:M	N/A [ ] Yes [ ]
TR5a	Transmit output voltage	7.2.2.3	STP:M	N/A [ ] Yes [ ]
TR5b	Transmit output voltage	7.2.2.3	UTP:M	N/A [ ] Yes [ ]
TR6a	Transmit return loss	7.2.2.4	STP:M	N/A [ ] Yes [ ]
TR6b	Transmit return loss	7.2.2.4	UTP:M	N/A [ ] Yes [ ]

A.7.1.5.2 Transmitter specification—(DS or DTRS or DTRP or ACON) and LMR and FIBRE

Item	Feature	Reference	Status	Support
FIBTR1a	Optical transmit asymmetry	13.7.2.3.1	DR4:M	N/A [ ] Yes [ ]
FIBTR1b	Optical transmit asymmetry	13.7.2.3.1	DR16:M	N/A [ ] Yes [ ]
FIBTR2a	Average optical power	13.7.2.3	DR4:M	N/A [ ] Yes [ ]
FIBTR2b	Average optical power	13.7.2.3	DR16:M	N/A [ ] Yes [ ]
FIBTR3	Average optical power off	13.7.2.3	M	Yes [ ]
FIBTR4a	Rise/fall time	13.7.2.3	DR4:M	N/A [ ] Yes [ ]
FIBTR4b	Rise/fall time	13.7.2.3	DR16:M	N/A [ ] Yes [ ]
FIBTR5	Overshoot	13.7.2.3	M	Yes [ ]

A.7.1.6 Receiver specification

A.7.1.6.1 Receiver specification—(DS or DTRS or DTRP or ACON) and LMR and COPPER

Item	Feature	Reference	Status	Support
RC1a	Receiver jitter tolerance (no noise)	7.2.3.1	DR4:M	N/A [ ] Yes [ ]
RC1b	Receiver jitter tolerance (no noise)	7.2.3.1	DR16:M	N/A [ ] Yes [ ]
RC2a	Receiver jitter tolerance (with noise)	7.2.3.1	DR4:M	N/A [ ] Yes [ ]
RC2b	Receiver jitter tolerance (with noise)	7.2.3.1	DR16:M	N/A [ ] Yes [ ]
RC3a	Receiver return loss	7.2.3.2	DR4:M	N/A [ ] Yes [ ]
RC3b	Receiver return loss	7.2.3.2	DR16:M	N/A [ ] Yes [ ]

A.7.1.6.2 Receiver specification—(DS or DTRS or DTRP or ACON) and LMR and FIBRE

Item	Feature	Reference	Status	Support
FIBRC1	Average received power, Pr, operating	13.7.2.4	M	Yes [ ]
FIBRC2	Signal detect threshold	13.7.2.4	M	Yes [ ]
FIBRC3a	Input rise/fall time	13.7.2.4	DR4:M	N/A [ ] Yes [ ]
FIBRC3b	Input rise/fall time	13.7.2.4	DR4:M	N/A [ ] Yes [ ]
FIBRC4a	Receiver jitter tolerance (no noise)	7.2.3.1	DR4:M	N/A [ ] Yes [ ]
FIBRC4b	Receiver jitter tolerance (no noise)	7.2.3.1	DR16:M	N/A [ ] Yes [ ]

A.7.2 PHY Characteristics at High Media Rate

A.7.2.1 100BASE-X—(DS or DTRS or DTRP) and DR100

Item	Feature	Reference	Status	Support
100BASE-X	Completed PICS proforma for 100BASE-X PCS and PMA sub-layers	[802.3] 24.8	M	Yes [ ]

A.7.2.2 100BASE-TX—(DS or DTRS or DTRP) and DR100 and COPPER

Item	Feature	Reference	Status	Support
PD1	Integrates 100BASE-X PMA and PCS	[802.3] 25.1	M	Yes [ ]
PD2	Compliance with service primitives	9.8.1.1 9.7.2.2	M	Yes [ ]
PD3	Compliance with ANSI X3.263-1995 [TP-PMD], 7–11 and normative annex A, with listed exceptions.	9.8.1.3	M	Yes[ ]
PD4	Minimum jitter test pattern length of 4500 octets	9.8.1.3.14	M	Yes [ ]
PD5	Compliance with crossover function	9.8.1.3.15	M	Yes [ ]

A.7.2.3 100BASE-FX—(DS or DTRS or DTRP) and DR100 and FIBRE

Item	Feature	Reference	Status	Support
PD6	Integrates 100BASE-X PMA and PCS	[802.3] 26.1	M	Yes [ ]
PD7	Compliance with service primitives	9.8.1.1 9.7.2.2	M	Yes [ ]

Item	Feature	Reference	Status	Support
PD8	Compliance with ISO 9314-3: 1990, 8–10 with listed exceptions	9.8.1.4	M	Yes[ ]
PD9	Compliance with crossover function in cable	13.9.1.6	M	Yes [ ]

A.7.2.4 1000BASE-X—(DS or DTRS or DTRP) and DR1000

Item	Feature	Reference	Status	Support
1000BASE-X	Completed PICS proforma for 1000BASE-X PCS and PMA sublayers	[802.3] 36.7	M	Yes [ ]

A.7.2.5 1000 Mbit/s, PSC-X—(DS or DTRS or DTRP) and DR1000 and PSC-X

Item	Feature	Reference	Status	Support
PD10	Integrates 1000BASE-X PMA and PCS	[802.3] 36.1	M	Yes [ ]
PD11	Compliance with MAC to GMII service primitives	9.8.2.1	M	Yes [ ]
PD12	Compliance with PSC to PMC service primitives	9.8.2.2	M	Yes[ ]

A.7.2.6 1000 Mbit/s, PMC-LX and PMC-SX—(DS or DTRS or DTRP) and DR1000 and (PMC-LX or PMC-SX) and FIBRE

Item	Feature	Reference	Status	Support
PD13	Completed PICS proforma for PMD sublayer and base-band medium type 1000BASE-LX and 1000BASE-SX	[802.3] 38.12	M	Yes [ ]
PD14	Compliance with crossover function	13.10.1.3	M	Yes [ ]

A.7.2.7 1000Mbit/s, PMC-CX—(DS or DTRS or DTRP) and DR1000 and PMC-CX and COPPER

Item	Feature	Reference	Status	Support
PD15	Completed PICS proforma for PMD sublayer and base-band medium type 1000BASE-CX	[802.3] 39.8	M	Yes [ ]
PD16	Compliance with crossover function	9.8.2.4.1.1	M	Yes [ ]

A.7.2.8 1000BASE-T—(DS or DTRS or DTRP) and DR1000

Item	Feature	Reference	Status	Support
1000BASE-T	Completed PICS proforma for 1000BASE-T PCS and PMA sublayers	[802.3] 40.12	M	Yes [ ]

A.7.2.9 1000 Mbit/s, PSC-T—(DS or DTRS or DTRP) and DR1000 and PSC-T

Item	Feature	Reference	Status	Support
PD17	Integrates 1000BASE-T PMA and PCS	[802.3] 40.1	M	Yes [ ]
PD18	Compliance with MAC to GMII service primitives	9.8.2.1	M	Yes [ ]
PD19	Compliance with PSC to PMC service primitives	9.8.2.2	M	Yes[ ]

A.7.2.10 1000 Mbit/s, PMC-T—(DS or DTRS or DTRP) and DR1000 and PMC-T

Item	Feature	Reference	Status	Support
PD20	Compliance with crossover function	9.8.2.4.3.2	M	Yes [ ]

A.7.3 Access control

A.7.3.1 Station access control—(DS or DTRS or DTRPSE)

Item	Feature	Reference	Status	Support
SRA1	Perform station ring access control	5.9	M	Yes [ ]

A.7.3.2 Station access control—(DS or DTRS or DTRPSE) and COPPER

Item	Feature	Reference	Status	Support
*SRA2	Phantom circuit source/return	7.2.1.1	LMR:M DR100:O DR1000:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
SRA3	Ring insertion current/voltage	7.2.1.1	LMR:M PRED20:O	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ]
SRA4	Ring bypass current/voltage	7.2.1.1	LMR:M PRED20:O	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ]

Item	Feature	Reference	Status	Support
*SRA5	Lobe fault indication	7.2.1.2	LMR:M PRED20:O	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ]
PREDICATE— PRED20 = DR100 **AND** SRA2				

A.7.3.3 Station access control—(DS or DTRS or DTRPSE) and FIBRE

Item	Feature	Reference	Status	Support
SRA6	Ring insertion	13.7.2.2	LMR:M HMR:X.34	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
SRA7	Ring bypass	13.7.2.2	LMR:M HMR:X.34	N/A [ ] Yes [ ] N/A [ ] Yes [ ]
NOTE— X.34: This style of insertion/bypass is not used at high media rate. Fibre insertion/bypass requirements at high media rate are dealt with by the 100BASE-X and 1000BASE-X PICS items.				

A.7.3.4 C-Port in port mode access control—DTRPPM

Item	Feature	Reference	Status	Support
PRA1	Perform port mode ring access control	8.3	M	Yes [ ]

A.7.3.5 C-Port in port mode access control—DTRPPM and COPPER

Item	Feature	Reference	Status	Support
PRA2	Phantom dc load	8.3.3	LMR:M DR100:O DR1000:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]
*PRA3	Phantom circuit insert detection	8.3.1	LMR:M DR100:O DR1000:X	N/A [ ] Yes [ ] N/A [ ] Yes [ ] No [ ] N/A [ ] Yes [ ]

A.7.3.6 C-Port in port mode access control—DTRPPM and FIBRE

Item	Feature	Reference	Status	Support
PRA4	Insertion/bypass detection	13.7.2.2	LMR:M HMR:X.35	N/A [ ] Yes [ ] N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
NOTE— X.35: This style of insertion/bypass is not used at high media rate. Fibre insertion/bypass requirements at high media rate are dealt with by the 100BASE-X and 1000BASE-X PICS items.				

A.7.3.7 Concentrator access control—(ACON or PCON) and COPPER

Item	Feature	Reference	Status	Support
CRA1	Ring insertion max time	8.3.2	M	Yes [ ]
CRA2	Ring bypass max time	8.3.2	M	Yes [ ]
CRA3	Phantom dc load	8.3.3	M	Yes [ ]
CRA4	Max ring open time	8.3.2	M	Yes [ ]
CRA5	Phantom path leakage resistance	8.3	M	Yes [ ]
CRA6	Ring access control insert & bypass	8.3.1	M	Yes [ ]

A.7.3.8 Concentrator access control—(ACON or PCON) and FIBRE

Item	Feature	Reference	Status	Support
CRA7	Ring insertion	13.7.2.2	M	Yes [ ]
CRA8	Ring bypass	13.7.2.2	M	Yes [ ]

A.7.4 Connector specification

A.7.4.1 Connector specification—DS or DTRS or DTRP

Item	Feature	Reference	Status	Support
MI1a	STP media interface station connector	7.2.5.1	PRED21:M	N/A [ ] Yes [ ]
MI1b	STP media interface station contact mapping	7.2	PRED21:M	N/A [ ] Yes [ ]
MI1c	STP media interface concentrator connector	8.1.1	PRED22:M	N/A [ ] Yes [ ]
MI1d	STP media interface concentrator contact mapping	8.1.1	PRED22:M	N/A [ ] Yes [ ]
MI2a	UTP media interface station connector	7.2.5.2	PRED23:M	N/A [ ] Yes [ ]
MI2b	UTP media interface station contact mapping	7.2	PRED23:M	N/A [ ] Yes [ ]
MI2c	UTP media interface concentrator connector	8.1.1	PRED24:M	N/A [ ] Yes [ ]
MI2d	UTP media interface concentrator contact mapping	8.1.1	PRED24:M	N/A [ ] Yes [ ]

Item	Feature	Reference	Status	Support
MI3a	Fibre media interface connector: Duplex SC	13.7.2	PRED25:O.36	N/A [ ] Yes [ ] No [ ]
MI3b	Fibre media interface connector: BFOC/2,5	13.7.2	PRED25:O.36	N/A [ ] Yes [ ] No [ ]
MI3c	Fibre media interface connector: Other	13.7.2	PRED25:O.36	N/A [ ] Yes [ ] No [ ]
MI3d	Fibre media interface connector: Duplex SC	13.9.1.5	PRED26:O.37	N/A [ ] Yes [ ] No [ ]
MI3e	Fibre media interface connector: FO-PMD MIC	13.9.1.5	PRED26:O.37	N/A [ ] Yes [ ] No [ ]
MI3f	Fibre media interface connector: ST Connector	13.9.1.5	PRED26:O.37	N/A [ ] Yes [ ] No [ ]
MI3g	Fibre media interface connector: Other	13.9.1.5	PRED26:O.37	N/A [ ] Yes [ ] No [ ]
MI3h	Fibre media interface connector: SG	AB1.2.1	PRED27:O.47	N/A [ ] Yes [ ] No [ ]
MI3I	Fibre media interface connector: LC	AB1.2.2	PRED27:O.47	N/A [ ] Yes [ ] No [ ]
MI3j	Fibre media interface connector: MT-RJ	AB1.2.3	PRED27:O.47	N/A [ ] Yes [ ] No [ ]
MI3k	Fibre media interface connector: Other	13.10.1.2	PRED27:O.47	N/A [ ] Yes [ ] No [ ]
M14a	Twin-axial media interface connector: 9-pin D subminiature connector	[802.3] 39.5.1.1	PRED28:O.48	N/A [ ] Yes [ ] No [ ]
MI14b	Twin-axial media interface connector: 9-pin D subminiature connector contact mapping	[802.3] 39.5.1.1	PRED28:O.48	N/A [ ] Yes [ ] No [ ]
M14c	Twin-axial media interface connector: 8-pin ANSI Fibre Channel style-2 connector	[802.3] 39.5.1.2	PRED28:O.48	N/A [ ] Yes [ ] No [ ]
MI14d	Twin-axial media interface connector: 8-pin ANSI Fibre Channel style-2 connector contact mapping	[802.3] 39.5.1.2	PRED28:O.48	N/A [ ] Yes [ ] No [ ]
M15a	UTP media interface connector	[802.3] 40.8.1	PRED29:O.48	N/A [ ] Yes [ ] No [ ]
M15b	UTP media interface connector contact mapping	[802.3] 40.8.2	PRED29:O.48	N/A [ ] Yes [ ] No [ ]

NOTE—
O.36, O.37, O.47, and O.48: Support for at least one of the options is required.

PREDICATES—
PRED21 = STP **AND** (DS **OR** DTRS **OR** DTRPSE)
PRED22 = STP **AND** DTRPPM
PRED23 = UTP **AND** (DS **OR** DTRS **OR** DTRPSE)
PRED24 = UTP **AND** DTRPPM
PRED25 = FIB **AND** LMR
PRED26 = FIB **AND** DR100
PRED27 = FIB **AND** DR1000
PRED28 = TWX **AND** DR1000
PRED29 = UTP4P **AND** DR1000

A.7.4.2 Connector specification—(ACON or PCON) and LMR

Item	Feature	Reference	Status	Support
CC1a	STP media lobe connector	8.1.1	STP:M	N/A [ ] Yes [ ]
CC1b	UTP media lobe connector	8.1.1	UTP:M	N/A [ ] Yes [ ]
CC1c	Fibre media interface connector: Duplex SC	13.7.2	FIB:O.38	N/A [ ] Yes [ ] No [ ]
CC1d	Fibre media interface connector: BFOC/2,5	13.7.2	FIB:O.38	N/A [ ] Yes [ ] No [ ]
CC1e	Fibre media interface connector: Other	13.7.2	FIB:O.38	N/A [ ] Yes [ ] No [ ]
CC2a	Trunk connected STP MIC	8.2.1	O.39	Yes [ ] No [ ]
CC2b	Trunk connected UTP MIC	8.2.1	O.39	Yes [ ] No [ ]
CC2c	Trunk connected Fibre	13.7.2	O.39	Yes [ ] No [ ]
CC2d	No trunk connection	8.2.1	O.39	Yes [ ] No [ ]
CC3	Main ring signal path	8.2.1	M	Yes [ ]
CC4a	Trunk connected backup signal path	8.2.1	O.40	Yes [ ] No [ ]
CC4b	No trunk connection	8.2.1	O.40	Yes [ ] No [ ]
CC5	Lobe port indicators	8.2.1	O	Yes [ ] No [ ]
NOTE— O.38–O.40: Support of at least one of each option shown above is required.				

A.7.5 Concentrator specific requirements

A.7.5.1 Concentrator specific requirements—ACON and LMR

Item	Feature	Reference	Status	Support
AC1	Burst error correction	8.5.2	O	Yes [ ] No [ ]
AC2	Deleting interframe bits	8.5.2	O	Yes [ ] No [ ]
AC3a	Ring segment trunk port	8.2	O.41	Yes [ ] No [ ]
AC3b	No trunk port	8.2	O.41	Yes [ ] No [ ]
NOTE— O.41: Support of at least one of each option shown above is required.				

A.7.5.2 Concentrator specific requirements—PCON and LMR

Item	Feature	Reference	Status	Support
CPA1	Lobe return loss	8.4.1.1	M	Yes [ ]
CPA2a	Trunk reflection coefficient	8.4.1.2	O.42	Yes [ ] No [ ]
CPA2b	Ring segment boundary return loss	8.4.1.3	O.42	Yes [ ] No [ ]
CPA2c	No passive trunk	8.4.1	O.42	Yes [ ] No [ ]
CPA3	Maximum flat loss	8.4.2	M	Yes [ ]
CPA4	Published lobe attenuation values	8.4.2	M	Yes [ ]
CPA5	Crosstalk loss	8.4.4	M	Yes [ ]
CPA6	Lobe low-frequency response	8.4.3	M	Yes [ ]
CPA7a	Passive trunk low-frequency response	8.4.3	O.43	Yes [ ] No [ ]
CPA7b	No passive trunk	8.4.3	O.43	Yes [ ] No [ ]
CPA8a	Published passive trunk port	8.4	O.44	Yes [ ] No [ ]
CPA8b	Published ring segment boundary trunk port	8.4	O.44	Yes [ ] No [ ]
CPA8c	No trunk port	8.4	O.44	Yes [ ] No [ ]
CPA9a	Published passive trunk attenuation values	8.4.2	O.45	Yes [ ] No [ ]
CPA9b	No passive trunk	8.4.2	O.45	Yes [ ] No [ ]
NOTE— O.42–O.45: Support of at least one option shown above is required.				

Insert Annex AB after Annex AA:

Annex AB

(informative)

Small Form Factor Optical Fibre Connectors

AB.1 Scope

This annex defines small form factor, high density, optical fibre connectors and corresponding interfaces for Token Ring applications. Intermateability specification and graphical representation for each connector type are included. References to other applicable IEC and/or TIA standards are provided.

In the context of this annex, the term “connector” refers to the family of components that comprise the connector system, including receptacles, plugs, adapters, sockets, and jacks.

AB.1.1 Connector Requirements

The connector shall comply with all of the optical fibre performance requirements of ISO/IEC 11801 and ANSI/TIA/EIA-568 cabling standards.

The connector shall meet the dimensions and interface specifications of the corresponding IEC 61754 standard, or national equivalent (for example ANSI/TIA/EIA 604). The IEC 61754 standard supercedes the national equivalent.

The connector shall ensure transmit and receive polarity is maintained.

AB.1.2 Connector Interfaces

AB.1.2.1 SG Interface

The SG optical fibre connector interface is defined by the ANSI/TIA/EIA 604-7 Fibre Optic Connector Intermateability Specification, Type “SG” (FOCIS-7). Figure AB.1(a) depicts an SG plug and receptacle, as might be implemented on active network equipment. Figure AB.1(b) depicts an SG plug and socket, as might be implemented for passive network connections.

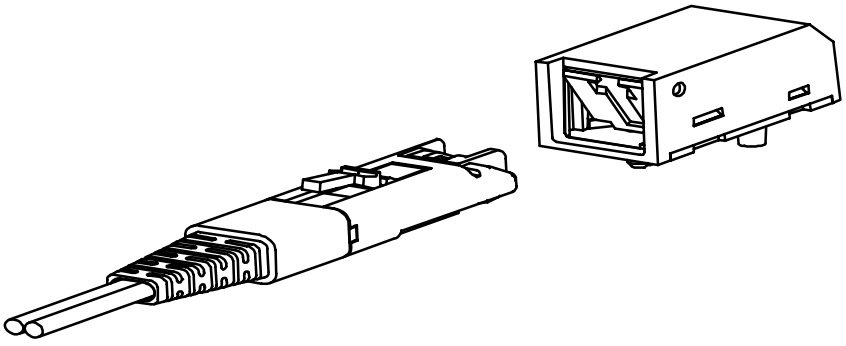


Figure AB.1(a)—SG plug and receptacle

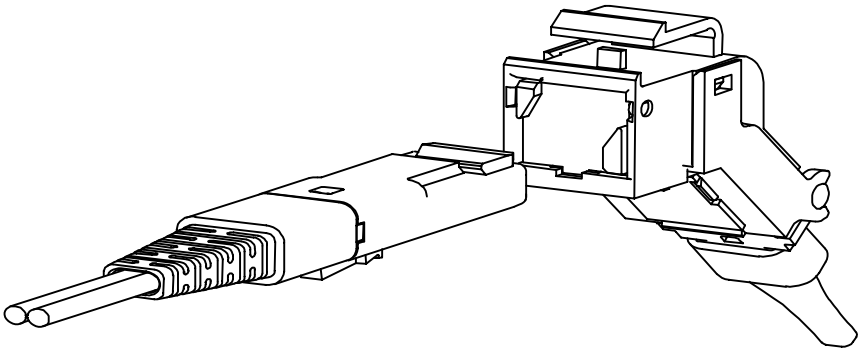


Figure AB.1(b)—SG plug and socket configuration

AB.1.2.2 LC Interface

The LC optical fibre connector interface is mechanically defined by the ANSI/TIA/EIA 604-10 Fibre Optic Connector Intermateability Specification, Type "LC" (FOCIS-10). Figure AB.2(a) depicts an LC plug and receptacle, as might be implemented on active network equipment. Figure AB.2(b) depicts an LC plug and adapter, as might be implemented for passive network connections.

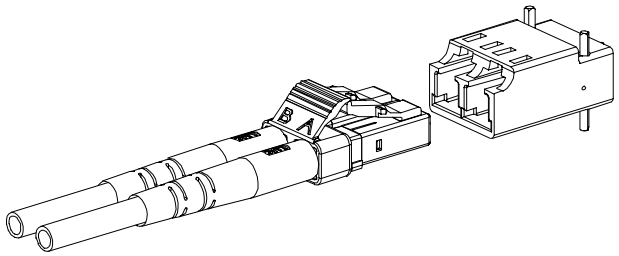


Figure AB.2(a)—LC plug and receptacle

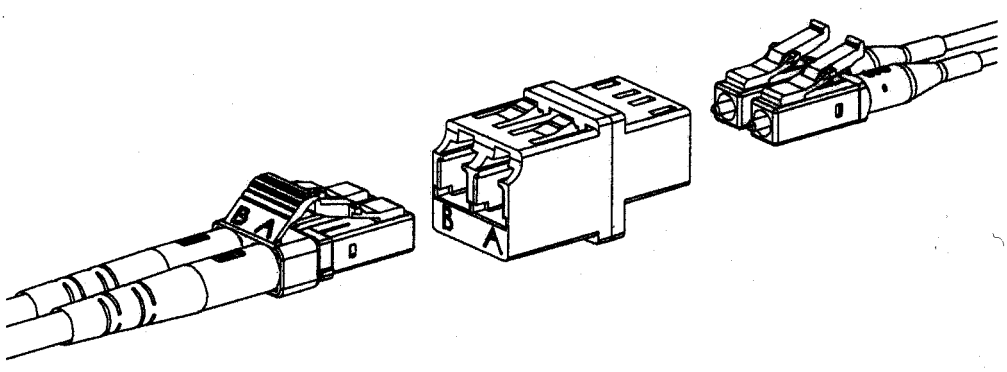


Figure AB.2(b)—LC plug and adapter configuration

AB.1.2.3 MT-RJ Interface

The MT-RJ optical fibre connector interface is mechanically defined by the ANSI/TIA/EIA 604-12 Fibre Optic Connector Intermateability Specification, Type "MT-RJ" (FOCIS-12). Figure AB.3(a) depicts an MT-RJ plug and receptacle, as might be implemented on active network equipment. Figure AB.3(b) depicts an MT-RJ plug and jack, as might be implemented for passive network requirements.

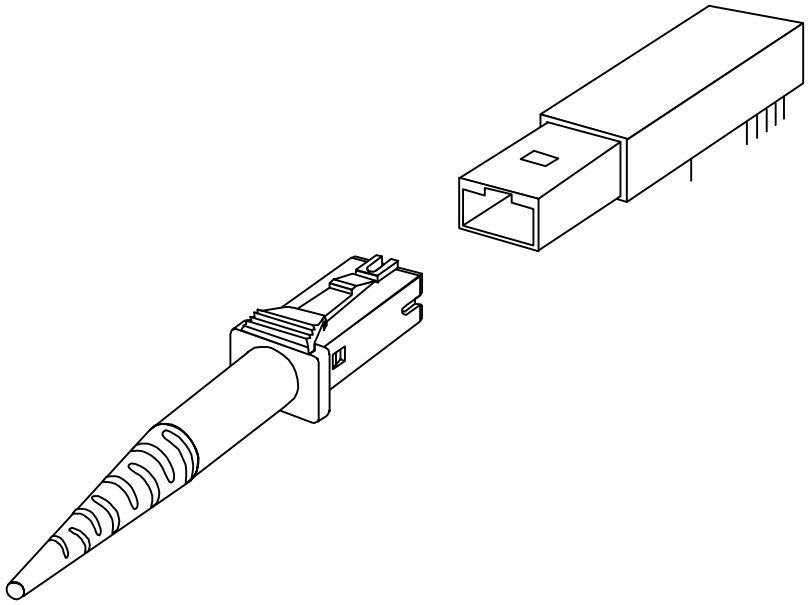


Figure AB.3(a)—MT-RJ plug and receptacle

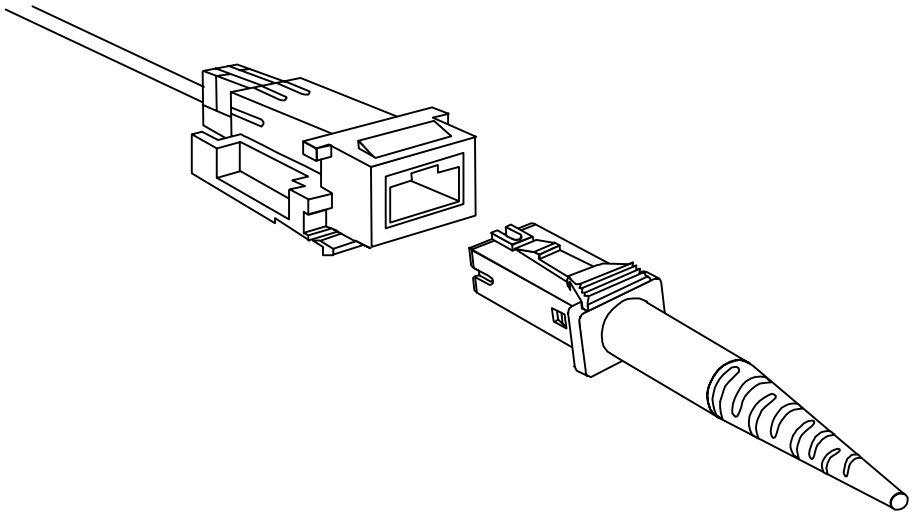


Figure AB.3(b)—MT-RJ plug and jack configuration

Add Annex AC:

Annex AC

(informative)

Differences from:

IEEE Std 802.5-1998, IEEE Std 802.5-1998/Amd. 1-1998, and IEEE Std 802.5t-2000

Purpose

The purpose of this annex is to identify major differences between this version of the standard and the combination of the Base, Amendment 1, and ANSI/IEEE Std 802.5-1998 standards. A listing of the changes made, including correction of errors found and elaboration of text, is given below. Each change includes a brief description and rationale for the change. These changes were made to extend Dedicated Token Ring as modified by ANSI/IEEE Std 802.5-1998 to support 1000 Mbit/s operation using the TXI access protocol.

Change Overview

Each of the following change descriptions identify the subclause being changed followed by the name of the clause or subclause. For example, AC.1 directly below defines the changes made to Clause 1.

AC.1 1 Overview

The scope of the document has been extended to include 1000 Mbit/s Dedicated Token Ring operation. Normative references have been extended to include the relevant IEEE Std 802.3-1998 sources. Definitions for 1000 Mbit/s terms have been added, along with a set of acronyms for describing 1000 Mbit/s PHY aspects.

AC.2 2.2.3 1000 Mbit/s C-Port and Station functional organization and data flow

This new subclause was added to specify the 1000 Mbit/s C-Port and Station functional organization and data flow for Twisted Pair media and Fibre Optic media. Definitions of the interfaces used at 1000 Mbit/s and an overview figure of the C-Port and Station are included.

AC.3 9 Dedicated Token Ring

A new value for the media rate option flags FSMRO and FPMRO was defined to designate 1000 Mbit/s. The first reserved value of option flags FSMRO and FPMRO has been increased to accommodate the new 1000 Mbit/s setting.

AC.4 9.1.1.6 PMAC and SMAC Frame and Token Signals

Frame properties L and M have been changed to accommodate the way in which transmit aborts are encoded on the GMII interface.

AC.5 9.2 STATION TXI ACCESS PROTOCOL SPECIFICATION

Throughout this subclause there are references to 100 Mbit/s and the High Media Rate. Some of these references were incorrect in that behavior common to both 100 Mbit/s and 1000 Mbit/s was described using the 100 Mbit/s designator. In these cases the description was changed to High Media Rate. Conversely, some High Media Rate items did not apply at 1000 Mbit/s and so have been changed to 100 Mbit/s.

High Media Rate Trade-up, as defined in ANSI/IEEE Std 802.5-1998, increases the media rate from 4 Mbit/s or 16 Mbit/s to 100 Mbit/s. This protocol is not extensible and so cannot include 1000 Mbit/s as a destination speed. Therefore, the protocol has been renamed 100 Mbit/s Trade-up and consequently all references to High Media Rate Trade-up have been changed to 100 Mbit/s Trade-up. Note that to avoid confusion, flag and timer names have remained unchanged from ANSI/IEEE Std 802.5-1998.

AC.6 9.2.1.2 Station Transmit FSM Overview

An incorrect counter reference has been corrected in Figure 9.2-2. The transition that aborts an overlength frame when FPASO=1, incorrectly incremented an undefined counter MAX_FR when it should have incremented the Abort Error Transmitted Counter CSABT.

AC.7 9.2.3.2 Station Protocol Flags

The flags FSTXC and FSTI refer to PHY primitives and as such have had parallel 1000 Mbit/s references added. In such cases, operation at speeds lower than 1000 Mbit/s remains unchanged.

FSPDC (Flag Station Phantom Drive Control) is set to 1 for Stations using the 1000 Mbit/s media rate.

AC.8 9.2.4.3 Transmit States

Paragraphs have been added to define operation at 1000 Mbit/s, referring to relevant sections in subclause 9.8.

The primitive PS_UNITDATA.request(Tx_indication=Data_octet) used during 100 Mbit/s operation has been corrected to PS_UNITDATA.request(Tx_indication=Data_byte).

AC.9 9.2.5.1 Station Join — Station Operation Table

Refs 1107 and 3179

These entry point transitions are no longer conditioned on FSANO=0. This is because FSANO=1 for 1000 Mbit/s implementations using PSC-T, but FSANO=0 for 1000 Mbit/s PSC-X implementations as well as lower media rates.

Ref 3150

This transition fires at 100 Mbit/s only and so the “High Media Rate” note has been changed to “100 Mbit/s only.” The transition’s behavior has not been modified.

Ref 3177

This transition deals with transmitting the first Registration Request and notes that at 100 Mbit/s phantom drive may or may not be requested. The note has been expanded to indicate that at 1000 Mbit/s phantom drive will not be requested. The transition behavior has not been modified.

Refs 3120 and 3159

These transitions occur when the Station’s request for registration with the TXI access protocol has failed, but is permitted to continue with emulation of the TKP protocol. The comments associated with these transitions have been clarified to indicate why, although the transitions occur at 4 Mbit/s and 16 Mbit/s only, a test of the Media Rate Flag FSMR is not performed. The transition behaviors have not been modified.

Ref 3122

The comment for this 100 Mbit/s Trade-up transition has been modified to clarify that trade-up does not involve the 1000 Mbit/s media rate. The transition behavior has not been modified.

Ref 3181

This transition removes the Station on detection of Wire Fault. Wire Fault cannot be detected at 1000 Mbit/s, since no phantom drive is used. Therefore, the comment has been changed to indicate that this transition fires at 100 Mbit/s only.

Refs 3210 and 3211

These transitions begin transmission of a frame. The counter CSBTX is initialized to a constant derived from the size of the media-dependent portion of the frame. This constant varies depending on the medium rate. A new value has been added for 1000 Mbit/s operation.

Refs 3313 and 3314

These transitions transmit beacon frames. The original comments suggest that the availability of phantom drive affected the beacon type, when in fact it is the availability of a Signal Loss Detection function that controls the beacon type. The comment has been updated accordingly. The transition behaviors have not been modified.

AC.10 9.2.5.8.1 Precise specification of “Event /Events & Conditions”

The PS_STATUS.indication entries have had 1000 Mbit/s references added.

AC.11 9.2.5.8.2 Precise specification of “Actions / Outputs”

The INSERT, PM_CONTROL.request, PS_CONTROL.request and Remove_station primitives have had 1000 Mbit/s references and comments added. Some of these primitives incorrectly quote corresponding PHY clauses for operation at 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s, and such errors have been corrected.

Set_initial_conditions has had a comment added to the effect that the PHY is already assumed to be initialized at the correct medium rate.

TX_AB and TX_SFS have had 1000 Mbit/s paragraphs added.

AC.12 9.2 C-Port Join and TXI Access Protocol Specification

Throughout this subclause there are references to 100 Mbit/s and the High Media Rate. Some of these references were incorrect in that behavior common to both 100 Mbit/s and 1000 Mbit/s was described using the 100 Mbit/s designator. In these cases the description was changed to High Media Rate. Conversely, some High Media Rate items did not apply at 1000 Mbit/s and so have been changed to 100 Mbit/s.

High Media Rate Trade-up, as defined as ANSI/IEEE Std 802.5-1998, increases the media rate from 4 Mbit/s or 16 Mbit/s to 100 Mbit/s. This protocol is not extensible and so cannot include 1000 Mbit/s as a destination speed. Therefore, the protocol has been renamed 100 Mbit/s Trade-up and consequently all references to High Media Rate Trade-up have been changed to 100 Mbit/s Trade-up. Note that to avoid confusion flag and timer names have remained unchanged from ANSI/IEEE Std 802.5-1998.

AC.13 9.3.3.2 PMAC Protocol Flags

Flag FPPLD was incorrectly named and described as a phantom loss detection flag. It is in fact a protocol loss detection flag. The description and flag names have been changed accordingly.

AC.14 9.3.3.3.3 C-Port Transmit States

Paragraphs have been added to describe behavior at 1000 Mbit/s. The incorrect usage of PS_UNITDATA.request(Tx_indicator=Data_octet) has been changed to PS_UNITDATA.request(Tx_indicator=Data_byte) for 100 Mbit/s operation.

AC.15 9.2.5.1 C-Port Join Port Operation Table

Refs 1107 and 1108

These entry point transitions are no longer conditioned on FPANO=0. This is because FPANO=1 for 1000 Mbit/s implementations using PSC-T, but FPANO=0 for 1000 Mbit/s PSC-X implementations as well as lower media rates.

Ref 1113

This transition was designated “High Media Rate only,” but since it is requesting operation *with* phantom drive it is not applicable to 1000 Mbit/s and the comment has been changed accordingly. The transition behavior has not been modified.

Refs 1201 and 1202

These transitions begin transmission of a frame. The counter CPBTX is initialized to a constant derived from the size of the media-dependant portion of the frame. This constant varies depending on the media rate. A new value has been added for 1000 Mbit/s operation.

Refs 1812 and 1813

These transitions involve phantom drive. Since phantom drive is not used at 1000 Mbit/s, a comment has been added to indicate that the transitions do not apply to 1000 Mbit/s implementations.

AC.17 9.3.4.7.1 Precise specification of “Event / Events & Conditions”

The PM_STATUS and PS_STATUS.indication entries have had 1000 Mbit/s references added.

AC.17 9.3.4.7.2 Precise specification of Actions

The INSERT, PM_CONTROL.request, PS_CONTROL.request and Remove_station primitives have had paragraphs added to document operation at 1000 Mbit/s. Some of these primitives incorrectly quote corresponding PHY clauses for operation at 4 Mbit/s, 16 Mbit/s and 100 Mbit/s and such errors have been corrected.

Set_initial_conditions has had a comment added to the effect that the PHY is already assumed to be initialized at the correct medium rate.

TX_AB and TX_SFS have had 1000 Mbit/s paragraphs added.

AC.18 9.7.3 C-Port Specific Components and Specifications, 1000 Mbit/s operation

This subclause for operation at 1000 Mbit/s replaces the place-marker.

AC.19 9.8 Physical Layer Definition for High Media Rate

The first paragraph has been updated to indicate where 1000 Mbit/s operation is defined.

A new subclause 9.8.2 has been added to describe 1000 Mbit/s operation, and it replaces the original 9.8.2 which described 1000 Mbit/s operation as “To Be Defined.”

AC.20 11.3.1 DTR MAC MIB definitions

dtrStationMaxFrameSize and dtrCportMaxFrameSize have been changed to allow for the larger maximum frame size when operating at 1000 Mbit/s. The maximum permitted frame size at 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s remains unchanged. A new maximum value of 18 211 is introduced for operation at 1000 Mbit/s.

AC.21 13.10 1000 Mbit/s Physical Medium Components

This new subclause defines the Physical Medium Components for a fibre optic Station or C-Port operating at 1000 Mbit/s.

AC.22 14 Formats And Facilities for High Media Rate

Throughout Clause 14, references to High Media Rate Trade-up have been changed to 100 Mbit/s Tradeup.

AC.23 14.2.2.2 1000 Mbit/s PSC-X Operation

This new subclause describes the media-dependent frame fields for 1000 Mbit/s operation using PSC-X.

AC.24 14.2.2.3 1000 Mbit/s PSC-T Operation

This new subclause describes the media-dependent frame fields for 1000 Mbit/s operation using PSC-T.

AC.25 14.5.1.1.1 Flag, Station Auto-Negotiation Option

The description of this flag has changed because FSANO is now used during PHY initialization when operating at the High Media Rate. At 1000 Mbit/s, this flag is set to 1 or 0, depending on the type of PHY used. At lower media rates, FSANO is always set to 0.

AC.26 14.5.1.1.5 Flag, Station Medium Rate Option

A new value, designating 1000 Mbit/s operation, has been defined.

AC.27 14.5.1.2 Station Policy Variable Definitions

The correct maximum value for SPV(MAX_TX) has been defined for operation at 1000 Mbit/s. A note has been added to explain that the choice of SPV(MAX_TX) is such that the same maximum media-independent frame size applies for operation at 16 Mbit/s, 100 Mbit/s, and 1000 Mbit/s.

AC.28 14.5.1.3 Allowable Station Policy Flag and Variable Settings

Alterations have been made to constrain 1000 Mbit/s operation so that

a) Phantom Drive is not used at 1000 Mbit/s.
b) Operation at 1000 Mbit/s uses the TXI access protocol only.

Additionally,

— The assertion conditional on FSHSO=1 has been removed since this option flag does not exist.
— FSANO must be set to 0 for 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s operation.

AC.29 14.5.2.1.1 Flag, C-Port Auto-Negotiation Option

The description of this flag has changed because FPANO is now used during PHY initialization when operating at the High Media Rate. At 1000 Mbit/s, this flag is set to 1 or 0, depending on the type of PHY used. At lower media rates, FPANO shall always be set to 0.

AC.30 14.5.2.1.4 Flag, C-Port Medium Rate Option

A new value, designating 1000 Mbit/s operation, has been defined.

AC.31 14.5.2.2 C-Port Policy Variable Definitions

The correct maximum value for PPV(MAX_TX) has been defined for operation at 1000 Mbit/s. A note has been added to explain that the choice of PPV(MAX_TX) is such that the same maximum media-independent frame size applies for operation at 16 Mbit/s, 100 Mbit/s, and 1000 Mbit/s.

AC.32 14.5.2.3 Allowable C-Port Policy Flag and Variable Settings

Alterations have been made to constrain 1000 Mbit/s operation such that Phantom Drive is not used at 1000 Mbit/s.

Additionally,

— The assertions referencing Station Policy Variables have been corrected.
— FPANO must be set to 0 for 4 Mbit/s, 16 Mbit/s, and 100 Mbit/s operation.

AC.33 Annex A Protocol Implementation Conformance Statement (PICS)

New entries have been added throughout the PICS to detail 1000 Mbit/s operation. Conformance statements at other media rates remain unchanged.

AC.34 Annex AB Small Form Factor Optical Fibre Connectors

A new annex has been added to give information on small form factor optical fibre connectors which might be used in PMC-SX and PMC-LX implementations.